MILITARY TRAFFIC MANAGEMENT COMMAND (MTMC)

DEPARTMENT OF DEFENSE AUTOMATED PERSONAL PROPERTY SYSTEM (DAPPS)

ENTERPRISE ARCHITECTURE

OVERVIEW AND SUMMARY INFORMATION VERSION 1.0

July 30, 2002

Prepared for the
Headquarters, Military Traffic Management Command
Passenger and Personal Property Systems Branch
Hoffman Building II, Rm. 9S41
200 Stovall Street
Alexandria, VA 22332-5000
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Under Contract DAMT01-98-D-0005
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Abstract

Department of Defense Automated Personal Property System

Enterprise Architecture Overview and Summary Information (AV-1)

The Department of Defense (DoD) Automated Personal Property System (DAPPS) Overview and Summary Information (AV-1) product provides direction and guidance for planning the Department's personal property enterprise architecture. This C4ISR (a.k.a. DoD) Architecture Framework mandatory product supplies summary information about the architecture throughout development (interim versions) and upon completion (final version). The DAPPS AV-1 is a living document that is periodically updated to reflect evolving knowledge of the environment. Major points covered in this document are:

- The identification of organizations, people, and dates
- The designation of the purpose and a summary result of a needs analysis
- The architecture's scope, views list, products, and time-frames
- The context list of interrelated conditions of the environment where the architecture exists, its mission, rules, guidance, geographical location, and conventions followed
- The architecture's findings and results, to be included as recommendations in text
- The file formats, physical file names and formats, and tools used for the architecture project.

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Preface

Architectures provide a mechanism (a blueprint) for communicating understanding and managing complexity. Department of Defense (DoD) initiatives to improve its business processes, downsize, and modernize the force structure to successfully implement this strategy has placed a premium on finding opportunities for cross-organization leveraging, increased collaboration, and redefining ways of doing business. Architectures provide the framework for finding these opportunities and presenting recommendations or alternatives to decision-makers.

Managed properly, architectures can clarify and help optimize the interdependencies and interrelationships among related enterprise operations and the underlying IT infrastructure and applications that support them. The development, implementation, and maintenance of architectures are a recognized hallmark of successful public and private organizations.

The Military Traffic Management Command's (MTMC) vision is to be the provider of best value end-to-end surface transportation solutions …any time or place, on time…every time. Its mission is to provide global surface transportation and traffic management services to meet National Security objectives in peace and war. In order to achieve its vision and mission, MTMC's Strategic Plan 2002 outlines five imperatives with goals and objectives to guide the command in reengineering of core processes. The movement of personal property of DoD and Coast Guard service members is a core process within MTMC.

Effectively and efficiently transforming MTMC's personal property operational and technology environments requires a blueprint – commonly referred to as an enterprise architecture. The DAPPS Enterprise Architecture (EA) describes the movement of personal property in (1) logical terms, such as interrelated business processes and business rules, information needs and flows, work locations and users, and (2) in technical terms, such as hardware, software, data, communications, and security attributes, and performance standards. The architecture will aid decision makers in understanding the complexities around how MTMC manages and operates the movement of personal property today and how it wants to operate in the future. It also includes a roadmap for transitioning to this future operational state.

The DAPPS EA enables the MTMC Deputy Chief of Staff for Passenger and Personal Property (MTPP) and the Deputy Chief of Staff for Information Management (MTIM), through the Passenger and Personal Property Systems Office (PPPSO), to provide consistent priorities, direction, and oversight of the modernization of the personal property system and synchronization of Doctrine, Organization, Training, Materiel, Leadership, Personnel, & Facilities (DOTMLPF) throughout the DoD Components and other Federal Agencies.

1.0 BACKGROUND

1.1 GENERAL

Passenger and Personal Property Systems Office (PPPSO)

The PPPSO supports the design, development, integration, testing, fielding, implementation, sustainment, and maintenance of Automated Information Systems (AIS) for passenger movements, personal property movements and storage, and travel related business processes. The systems office ensures effective integration of plans, programs, projects, automated systems, and system operations utilizing a wide range of information management disciplines and transportation functional components and sub-systems. It supports HQ Military Traffic Management Command (MTMC) and United States Transportation Command (USTRANSCOM) level implementation of Electronic Data Interchange and Electronic Commerce, which supports U.S. Department of Army initiatives.

Transportation Operational Personal Property System (TOPS)

The management of personal property movement and storage today uses a stand alone (stovepipe) text-based, batch process system. Although the personal property movement and storage program functions under the management of the U.S. Army's MTMC (as the Department of Defense (DoD) Executive Agent), operations are carried out by Military Service and DoD agency Transportation Offices (TOs). As an enterprise, the management of personal property movement and storage using the current automated capability embodied in TOPS can not provide accurate real-time asset visibility, is not integrated well, is unnecessarily costly to maintain and interface with the commercial best practices, and is ineffective in supporting mission goals. The time has come to leverage technology and modernize management of personal property movement and storage within the DoD.

1.2 INFLUENCES

Operational Drivers

Joint Vision 2020 (JV2020) is the conceptual template of the Chairman of the Joint Chiefs of Staff for channeling the vitality and innovation of America's Armed Forces and leveraging technological advancements to achieve new levels of effectiveness in joint warfighting. JV2020 embodies the operational concepts of Dominant Maneuver, Precision Engagement, Full Dimensional Protection, and Focused Logistics.

Focused Logistics is the fusion of information, logistics, and transportation technologies to provide the joint force the right personnel, equipment and supplies in the right place, at the right time, and in the right quantity, across the full range of military operations. The Defense Transportation System (DTS) is that portion of the worldwide transportation infrastructure that supports the DoD across its range of operations. This range of operations consists of: the common-user, military and commercial assets, services, systems accepted by and contracted for, or controlled by DoD systems and facilities.

Information Fusion, one of the tenets of the Focused Logistics framework, embodies the concept of timely and accurate access and integration of logistics data throughout the world to provide reliable asset visibility and access to logistics resources. To achieve this concept of worldwide interoperable real-time information systems, capable of providing total asset visibility as part of a common relevant operational picture, a means to effectively link the operator and logistician across Services, support agencies, and commercial interests is needed.

Throughout the operational continuum, the personal property movement and storage program supports the joint warfighter, Services, and DoD Agencies in structuring the force to meet mission needs. The program supports the joint warfighter and contingency/wartime mission of the Services and Coast Guard by providing storage of personal property during extended deployments.

Enterprise Architecture & Framework Drivers

The Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Architecture Framework (AF), version 2.0, provides principles, concepts, and definitions that focus on operational and systems architectures to complement DoD technical architecture guidelines. This framework provides a common basis for developing architectures that can be easily understood and compared with other architectures. In Feb 1998, the Under Secretary of Defense (Acquisition and Technology), Acting Assistant Secretary of Defense Command, Control, Communications, and Intelligence (C3I), and Joint Staff Director for Command, Control, Communications, and Computer (C4) Systems directed that the C4ISR AF be used by all DoD Components to develop relatable architectures.1

The DTS Enterprise Architecture (EA) is designed to support the global strategic mobility mission of USTRANSCOM. For USTRANSCOM, efficiency in global-mobility is dependent upon an integrated information systems environment. Today's transportation technologies are primarily market-driven rather than pushed by DoD-funded research, development, and deployment. Commercial interest and competition now define the information technology from which the DTS may choose from to satisfy its spectrum of current and anticipated future mobility needs. With the new century comes an abundance of information that will need to be collected, analyzed, assessed, synthesized, and disseminated. This presents the DTS with an ever-increasing challenge to make sure its technology supports their transportation capabilities.

The DoD Automated Personal Property System (DAPPS) Enterprise Architecture (EA) is a requirements based / reference architecture, which is described in accordance with C4ISR AF and aligned with the DTS EA. EA development, implementation, and maintenance are basic tenets of effective IT management. Employed in concert with other important IT management controls, such as portfolio-based capital planning and investment control practices, the DAPPS EA ensures the personal property business and IT environments are configured to optimize mission performance of one of DoD's premier quality-of-life programs.

[1] Office of the Secretary of Defense Memorandum, *Strategic Direction for a DoD Architecture Framework*, February 23, 1998.

The goal of the DAPPS EA and supporting Configuration Management (CM) process is to set the stage for the integration of cross-functional, cross-Service information requirements as they relate to personal property shipment and storage. The DAPPS EA supports the premise that functional and architectural requirements will drive system migration or development implementations. The architecture provides the context within which operational analysis and systems engineering can be integrated to provide logical connectivity from strategic objectives to supporting processes and systems. DAPPS will be executed through phased implementations driven by the DAPPS EA operational view.

Architectural Drivers

The DAPPS EA generic activity description is not based on an organizational model or force structure, nor is it systems dependent. It is independent of specific business rules and application logic, but applies standards as applicable to the requirements set forth in the Joint Technical Architecture (JTA), the DTS EA, the Defense Information Infrastructure Common Operating Environment (DII COE), and the Defense Information Technology Security Certification and Accreditation Process (DITSCAP). Public Law requires the implementations of the DAPPS EA comply with the Workforce Investment Act of 1998, Section 508, Electronic and Information Technology.

2.0 DAPPS EA IDENTIFICATION INFORMATION

2.1 ARCHITECTURE NAME

The unique name given to this architecture is "Department of Defense Automated Personal Property System (DAPPS) Enterprise Architecture". The MTMC Deputy Chief of Staff for Passenger and Personal Property is the functional business proponent and responsible for synchronization of Doctrine, Organization, Training, Materiel, Leadership, Personnel, & Facilities (DOTMLPF) of the DAPPS implementation within the DoD Components and other Federal Agencies. MTMC's Director of Information Management (IM) is the technical proponent who provides consistent direction, priorities, and oversight of the DAPPS implementation. The Passenger and Personal Property Systems Office (PPPSO) is the DAPPS Architect and its director provides direction, priorities and oversight to the government and contractor support staff developing the DAPPS Enterprise Architecture, as well as implementations. The Personal Property Joint Development Team (JDT) provides liaison between the PPPSO and the Services and Agencies for the implementation of their cross-functional, cross-Service information requirements as they relate to the personal property shipment and storage.

2.2 PARTICIPATING ORGANIZATIONS

The organizations that are participating in the development of the DAPPS EA include:

MTMC

DCS Passenger and Personal Property

DCS Information Management

Passenger and Personal Property Systems Office

OSD Principle Staff Assistants

Logistics (DUSD (LA&LSM))

Finance (DUSD (COMPT))

Personnel (DUSD (P&R))

Military Services

Army, Navy, Air Forces, Marines, and Coast Guard

Defense Agencies/Other

Defense Integrated Military Human Resources Information System (DIMHRS)

Defense Finance Accounting System (DFAS)

Joint Staff

Joint Staff J4

CINC Reps

Personal Property Joint Development Team

Contractors	USTRANSCOM
SRA International, Inc.	JTCC
MicroTech	

2.3 TIME PERIOD OF THE DAPPS ENTERPRISE ARCHITECTURE

The DAPPS EA effort began on April 15, 2002, and the initial baseline iteration of the DAPPS EA was completed on July 30, 2002. The timeframe for the "To-Be" configuration of DAPPS is (30 September 2005). This is based on improved processes that can be implemented before 30 September 2005 (agreed-upon by the DTS community).

3.0 PURPOSE OF THE DAPPS ENTERPRISE ARCHITECTURE

3.1 GENERAL

MTMC is the executive agent for DoD Surface Passenger and Personal Property Shipment and Storage Programs, purchasing about $2.4 billion in transportation services each year. MTMC manages these quality-of-life programs, and provides the processes for the military services and their installation transportation offices to move passengers and personal property.

The PPPSO within MTMC supports the design, development, integration, testing, fielding, implementation, sustainment, and maintenance of AIS for passenger movements, personal property movements, and storage as well as travel related business processes.

MTMC and the DoD Service components have determined that redesign of the current personal property system will not only bear a significant return on investment, but will also provide a more responsive, user friendly, web-based, real-time solution to the management of personal property movement and storage requirements.

The DAPPS EA needs to provide a flexible framework that enhances usability, reliability, scalability, security, and accessibility for personal property customers and customer service providers worldwide. This architecture will support the requirement to provide the infrastructure for a future web-based, real-time, on-line transaction processing (OLTP) application(s). The initial iteration of the DAPPS EA has been established independent of emerging personal property business rules, yet it is flexible enough to be tailored and scaled as required when changes occur in the DoD Personal Property Program.

The DAPPS end state will provide one common interoperable picture on any box (platform independent) plugged into a single worldwide web-based environment (Internet). The data sharing linkage between legacy information systems and existing/emerging systems in a web-based environment could be similar to that depicted in Figure 3 -1.

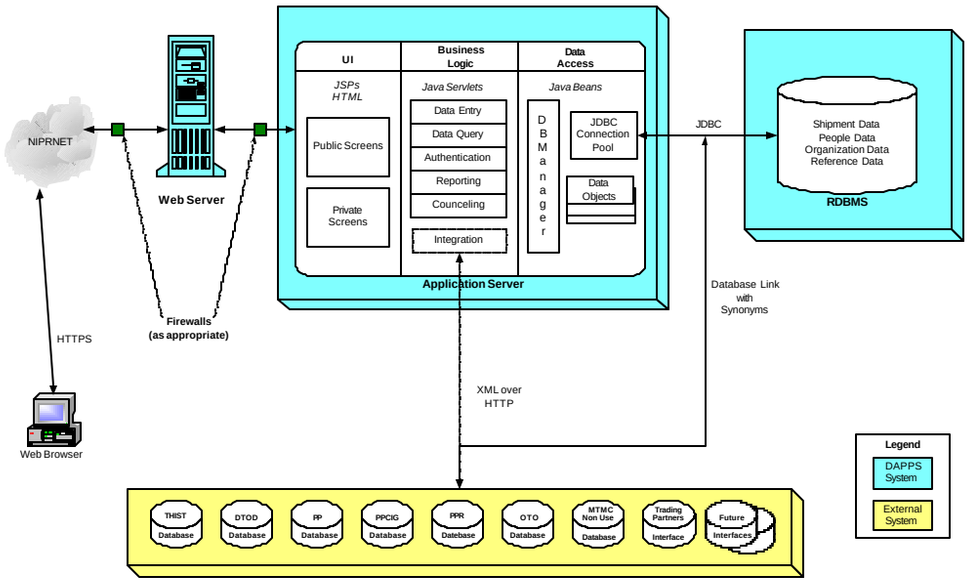

Figure 3-1: DAPPS – An Integrated, Web-Based, Real-Time Collaborative Environment

The information interoperability strategy for DAPPS is not based on a specific technology solution, but rather on a common technical direction that will support any authorized user, anywhere, and provide one common picture of the personal property application, movement, and storage process, as well as the infrastructure to support it. DAPPS EA will reach these goals by using the following interoperability approaches:

- **User Application Access** - Applications will be developed using Web technology.
- **Data Sharing** - Data Standards, Business Rules and a Common Schema will be developed for shared data. Data will be provided via a common access mechanism which will provide the customer real-time actionable information.
- **Platform Services** - The DII-COE will be used to provide a common software infrastructure.
- **Security** - Public Key Infrastructure (PKI) Technology will be implemented for user authentication and access control.

3.2 PLANNED ANALYSES

The DAPPS EA will be used in performing the following analysis:

- Functional requirements management and prioritization,
- Functional oversight,
- Cost benefit analysis,
- Interoperability assessments,
- Program assessments,
- and Fielding management.

3.3 ANALYTICAL PARTICIPANTS

The MTMC Deputy Chief of Staff for Passenger and Personal Property, (Personal Property Division) in collaboration with the MTMC Information Management Director, the Director of the PPPSO, and the Personal Property JDT is expected to perform analysis of the DAPPS EA. This management structure will provide the oversight necessary to implement the DAPPS and to coordinate policy and mission priorities. The management structure will also address issues that cut across organizational boundaries to facilitate the delivery of the required functionality in a timely manner.

3.4 PLANNED ARCHITECTURE-BASED DECISIONS

Analysis of the data/information contained in the DAPPS EA will be used to support the following types of decisions:

- Which DAPPS capabilities support the EA functional and systems requirements?
- What are the impacts and feasibility (procedural and technical) of DAPPS information exchange requirements?
- What mission functionality is to be developed, migrated or included in DAPPS?

- What information between DAPPS and other functional systems needs to be exchanged?
- Which applications warrant integration into DAPPS?
- Oversight of the selection for migration and integration into DAPPS applications that satisfy operational requirements.
- Ensure DAPPS applications use web-technology.
- Ensure data standards, business rules, and common schemas are developed for shared data.
- Ensure the DII-COE is used to provide common software infrastructure.
- Ensure guard-technology is used to transfer information between security domains.
- Ensure PKI is implemented for user authentication and access control.
- Ensure integration of architectures and implementation plans, processes, and capabilities support DAPPS.
- Ensure functionality, systems interfaces, key performance, parameters, and other interoperability requirements are being met.
- Review and approve the functional concept of operations (CONOPS) and the operational, systems, and technical architecture-compliant products for DAPPS.
- Identify, analyze, assess, prioritize, and integrate cross-functional enterprise issues.
- Ensure DAPPS builds on existing and emerging DTS and MTMC technologies, products, procedures, and integration strategies.
- Ensure DAPPS capabilities support seamless transition between peacetime and contingency operations.

- Do DAPPS capabilities enable joint total asset visibility through fully interoperable, secure, information systems?
- Do DAPPS capabilities enable the conduct of military operations using essential shared corporate data and transforming this data into usable decision support information?
- Do the DAPPS capabilities provide all authorized users web-based access to essential shared corporate data globally?
- Are the DAPPS capabilities being managed through total life cycle integration of logistics visibility, planning, and decision support (execution) processes?
- Do DAPPS capabilities meet or exceed DoD logistics metrics and cost reduction goals?

3.5 ALLOCATE PLANNED DECISIONS TO PARTICIPANTS

Table 3-1. Decision Allocations

Planned Decision	OPR
Which DAPPS capabilities support the EA functional and systems requirements?	DCS P&PP (MTPP-H)
What are the impacts and feasibility (procedural and technical) of DAPPS information exchange requirements?	DCS P&PP (MTPP-H)
What mission functionality is to be developed, migrated or included in DAPPS?	DCS P&PP (MTPP-H)
What information between DAPPS functional systems needs to be exchanged?	DCS P&PP (MTPP-H)
Which applications warrant integration into DAPPS?	PPPSO
Oversight of the selection for migration and integration into DAPPS applications that satisfy CINC and Joint Task Force (JTF) operational	JDT

Planned Decision	OPR
requirements.	
Ensure DAPPS applications use web-technology.	PPPSO
Ensure data standards, business rules, and common schemas are developed for shared data.	JDT
Ensure DII-COE is used to provide common software infrastructure.	PPPSO
Ensure guard-technology is used to transfer information between security domains.	PPPSO
Ensure PKI is implemented for user authentication and access control.	PPPSO
Ensure integrated architectures and implementation plans, processes, and capabilities support DAPPS.	DCS P&PP (MTPP-H)
Ensure functionality, systems interfaces, key performance parameters, and other interoperability requirements are being met.	DCS P&PP (MTPP-H)
Review and approve the functional concept of operations (CONOPS) and the operational, systems, and technical architecture-compliant products for the DAPPS.	DCS P&PP (MTPP-H)
Identify, analyze, assess, prioritize, and integrate cross-functional issues.	JDT

3.6 EXPECTED RESULTS FOR PLANNED ARCHITECTURE

General

A new enterprise architecture for the use and management of the Personal Property program is required that provides a flexible framework that enhances usability, reliability, scalability, security, and accessibility for personal property customers and customer service providers worldwide. This architecture will support the requirement to provide the systems infrastructure for a future web-based, real-time, on-line transaction processing (OLTP) application(s). Consistent with the Clinger-Cohen Act, DAPPS avoids a grand design - it is evolutionary; its capabilities or components are developed independently in small acquisition projects coordinated closely to prevent stovepipe development. The DAPPS architecture must be established independent of emerging personal property business rules and flexible enough to be tailored and scaled as required when changes occur in the DoD Personal Property Program.

Information Dominance

Information Dominance is a strategic imperative for MTMC's transformation. The goal of Information Dominance is to leverage emerging technologies that enable tactical and strategic advantage by achieving situational awareness, while denying information to any adversary. The intent is for transportation knowledge to be applied the right context, at the right time to permit the unimpeded flow of passengers and cargo to their destination. Information Dominance objectives include integrated IT solutions, knowledge management, modeling and simulations, and reliable communications.

Future Capabilities

The DAPPS EA will be non-restrictive to future development activities, fully scaleable, rigorously fault tolerant and fail-safe, extremely efficient, secure, flexible, and capable of being DII COE Integration and Run-Time Specification (I&RTS) Level 7 Certified. It will include, but not be limited to, security, customer service assurance (CSA), integration with existing as well as future data and voice portals, integration of data from the current operational personal property system [TOPS] and consider integration with cutting edge and future technologies such as wireless and remote computing.

DAPPS and Information Dominance

The primary goal of DAPPS is to provide a fused, real-time, multidimensional view of personal property management and movement through an ability to coordinate across organizations, sites, and systems. Personal property decision support processing is enabled by the ability to collect and analyze real-time personal property application, movement, and storage information. Both capabilities are keystones to attaining the primary goals of Information Dominance - sharing knowledge with partners, stakeholders, and customers and integrated IT solutions that support all phases of end-to-end DTS services, including vertical and horizontal linked and integrated e-business tools, which enable rapid exchange and display of information and data.

A Centrally Managed Program

The DAPPS EA is designed to satisfy the enterprise-wide informational needs of its customers. It provides a centrally managed umbrella architecture under which implementation of capability will be performed in a network/information-centric environment (web-based) managed by a MTMC project manager. Capability implementations may be phased over time based on available fiscal resources.

3.7 DAPPS VIRTUAL DATA ENVIRONMENT (VDE) CONCEPT

Like the MTMC Enterprise Decision Support System (MEDSS) environment, the DAPPS EA envisions an integrated data environment as a fundamental concept to achieve vertical and horizontal linked and integrated corporate data. When MTMC data is viewed and treated as a corporate asset, it can be coupled with appropriate business tools to enable the rapid exchange and display of information and data. The DAPPS EA concept of a virtual data environment (VDE) is consistent with the MTMC enterprise-wide operational data store (ODS), data warehouse, and decision support system (DSS) environment.

In logical terms, the DAPPS VDE is comprised of an Event Driven Integration Hub, an Analysis Engine, a Decision Engine, a Data Warehouse, and various Analytical Applications. A key assumption of the DAPPS VDE concept is that real-time decision processing is not done in a single monolithic step. Instead, the three main components to the DAPPS VDE concept; the event-driven hub, the analysis engine, and the decision engine, all work in concert to collect personal property

data, analyze it, and provide a real-time personal property decision support processing capability.[2] (See Figure 3-2).

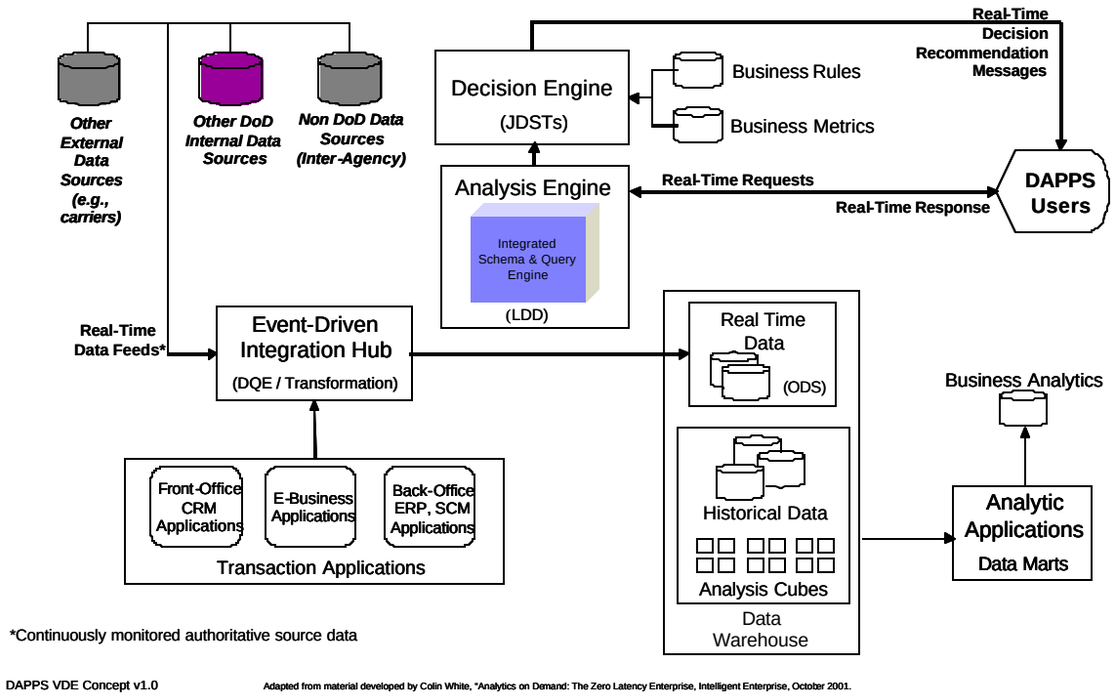

Figure 3-2: DAPPS Conceptual "Virtual" Data Environment

Event-Driven Hub

The Event-Driven Hub, like the MTMC Meta-Data Repository System, provides data transformation (date quality engineering/transformation) from operational and e-business authoritative source systems to the Real Time Data ODS within the logical construct of a corporate data warehouse. This function is critical for cleansing and normalizing data prior to utilization in either the data warehouse or ODS.

Analysis Engine

[2] Adapted from White, Colon. Analytics on Demand: The Zero Latency Enterprise. Intelligent Enterprise, October 2001

The heart of the DAPPS VDE concept model is the Analysis Engine. Essentially a logical data directory, it will point to the correct authoritative source of data in the Data Warehouse which contains both real-time data in its Operational Data Store (ODS) and snapshot historical (static data) in an archive. To maintain a near real-time view of operational data, ODS data-extract routines should be designed to capture essential elements of data (EED) continuously from authoritative source systems. For real-time data analysis, the Analysis Engine may be designed employing underlying data summarization using On-line Analytical Processing (OLAP) tools. These tools can asynchronously create data summaries and performance metrics on either a regularly scheduled basis or based on business rules. The summaries and metrics created could then be stored in the Data Warehouse and retrieved as required by the users.[3]

Decision Engine

The Decision Engine provides access to the DSS. It is a rules-driven engine that can make recommendations or create operational and e-business action messages in real time. For actual implementation the designer will be able to choose from several different types of decision engines. Chief among the available types of decision engines are data mining tools, customer relations management (CRM) analytic applications, and web real-time personalization type servers. All of these engines utilize business rules/metrics to support the decision-making functionality.

Lastly, the Analytical Applications are functional views of historical data that will provide various users their tailored views of the data to support their functional business processes.

[3] ibib.

4.0 DAPPS ENTERPRISE ARCHITECTURE SCOPE

4.1 PRODUCT LIST

Essential Products:

Table 4-1 lists the minimal set of Operational View (OV), System View (SV), and Technical View (TV) products required to describe the DAPPS EA that can be commonly understood and integrated within DoD and across organizational boundaries.

Table 4-1. DAPPS EA Essential Products

Product ID	Product Name	Date Produced	Current Version and Date Last Updated
AV-1	Overview and Summary Information	07/15/2002	Version 1.0
AV-2	Integrated Dictionary	07/15/2002	Version 1.0
OV-1	High Level Operational Concept Description[4]	07/15/2002	Version 1.4
OV-2	Operational Node Connectivity Description	07/15/2002	Version 1.0
OV-3	Operational Information Exchange Matrix	07/15/2002	Version 1.0
OV-5[5]	Activity Model	07/15/2002	Version 1.0
SV-1	System Interface Description	07/15/2002	Version 1.0
TV-1	Technical Architecture Profile	07/15/2002	Version 1.0

[4] Name change in Version 2.1 of the Architecture Framework

[5] While not specified as essential in version 2.0 of the C4ISR Architecture Framework, activity models are central to the operational architecture development methodology adapted by DAPPS. Activity models are mandatory in Version 2.1 of the Architecture Framework.

Supporting Products:

Table 4-2 lists additional products produced or needed over time to supplement the essential products to further define or add granularity to the DAPPS EA description.

Table 4-2. DAPPS EA Supporting Products

Product ID	Product Name	Date Produced	Current Version And Date Last Updated
AV-3[6]	Capability Maturity Profile	07/15/2002	Version 1.0
OV-4	Organizational Relationships Chart[7]	07/15/2002	Version 2.1
OV-6a	Operational Rules Model	TBD	TBD
OV-6b	Operational State Transition Description	TBD	TBD
OV-6c	Operational Event/Trace Description	TBD	TBD
OV-7	Logical Data Model	07/15/2002	Version 1.0
SV-2	Systems Communications Description	TBD	TBD
SV-3	Systems Matrix	TBD	TBD
SV-4	Systems Functionality description	TBD	TBD
SV-5	Operational Activity to System Function Traceability Matrix	TBD	TBD
SV-6	System Information Exchange Matrix	TBD	TBD
SV-7	System Performance Parameters Matrix	TBD	TBD
SV-8	System Evolution Description	TBD	TBD
SV-9	System Technology Forecast	TBD	TBD

[6] AV-3 is a new product in Version 2.1 of the DoD (a.k.a. C4ISR) Architecture Framework

[7] Name change in Version 2.1 of the Architecture Framework

Product ID	Product Name	Date Produced	Current Version And Date Last Updated
SV-10a	Systems Rules Model	TBD	TBD
SV-10b	Systems State Transition Description	TBD	TBD
SV-10c	Systems Event/Trace Description	TBD	TBD
SV-11	Physical Data Model[8]	07/15/2002	Version 1.0
TV-2	Standards Technology Forecast	07/15/2002	Version 1.0

4.2 PRODUCT'S TIME FRAME

All DAPPS EA reference architecture products are "To-Be" (30 September 2005).

[8] The physical data model reflects only that portion of DAPPS represented by the Proof of Concept (POC).

5.0 DAPPS ENTERPRISE ARCHITECTURE CONTEXT

5.1 TASKING

General

The following tasking led to the development of the DAPPS EA.

- Defense Transportation System Enterprise Architecture (To-Be), 11 January 2001
- MTMC Strategic Plan 2002

Legislative

- Clinger-Cohen Act - Information Technology Management Reform Act (Mandates performance and results-based management of IT resources.)
- Chief Information Officer of the Department of Defense Change to Title X (Defense Authorization Act for FY1999, Sec 331) (Reviews and provides recommendations to the Secretary of Defense on Department of Defense budget requests for information technology and national security systems.)
- Executive Order 13011; Federal Information Technology (Requires significant improvement regarding the management of any equipment (system, sub-system, or component) used to acquire, store, manipulate, manage, move, control, display, switch, interchange, transmit, or recap data or information technology.)

5.2 DAPPS ENTERPRISE ARCHITECTURE

Mission Need Statement

MTMC and the Services have determined that an enterprise architecture is needed to describe a more responsive, user friendly solution for DoD Personal Property movement, storage, and management capability. The new capability must provide a flexible framework that enhances

usability, reliability, scalability, security, and accessibility for personal property customers and customer service providers worldwide.

Statement of Work

System Architecture Design and Prototype Development Statement of Work, Passenger and Personal Property System Office, HQ MTMC, March 2002

5.3 DAPPS CONCEPT OF OPERATIONS

General

The design of this automated personal property movement and storage management information system provides users with the capability to initiate, process, and close out shipment requests using any compliant web browser and the Internet. The DAPPS design assumes that users of the system have access to a suitable computer and printer, are knowledgeable of basic computer/windows operations, and have access to the Internet, either from home, at work, or from a public access site such as a local library. The figures used in the following scenario are prototypes. Actual implementation may be different.

Imagine for a moment that it is the year 2005 … John Smith has just received permanent change of station (PCS) orders from his unit. Later that night, after the kids are in bed, John

Figure 5-1: DAPPS – Home Page [Prototype]

and his wife Sarah sit down at their home computer and bring up the DAPPS home page (Figure 5-1) to learn about the application process to make a domestic move. After they read over the information on the DAPPS home page they begin the move request process by creating a user name and password for this move, Figure 5-2. (For brevity, only some of the many alternate or exception flows are addressed in this concept scenario).

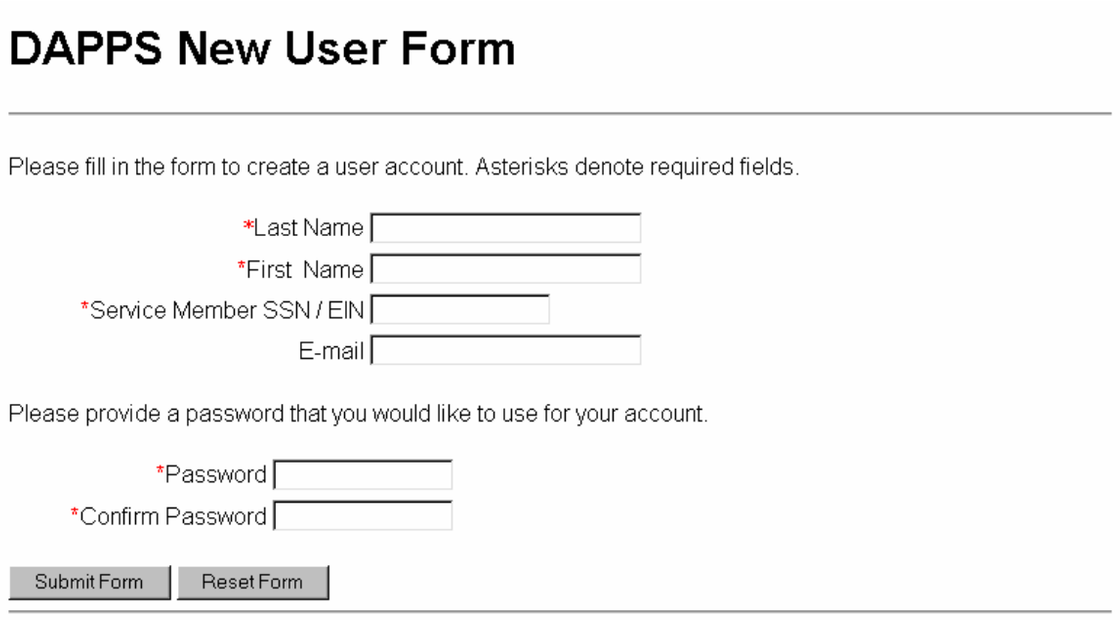

Figure 5-2: DAPPS – Creating an Account [Prototype]

Using their new move account, John and Sarah now go to the Orders tab (Figure 5-3a) of the DAPPS web site and initiate their move request. Throughout the process, John and Sarah use the interactive on-line help capability of DAPPS to answer their questions concerning the process and their entitlements.

DAPPS is designed to work on later versions of Microsoft Internet Explorer or Netscape Navigator that allow for 128-bit encryption of data. Performance is directly related to the bandwidth of the user's Internet connection. On a LAN environment optimal response times would be achieved.

John enters his identification information along with pertinent information from his PCS orders that will be used later in the process to authorize his application. Use of required fields and screen validations ensure the input of pertinent information, and increase the quality of data contained in DAPPS.

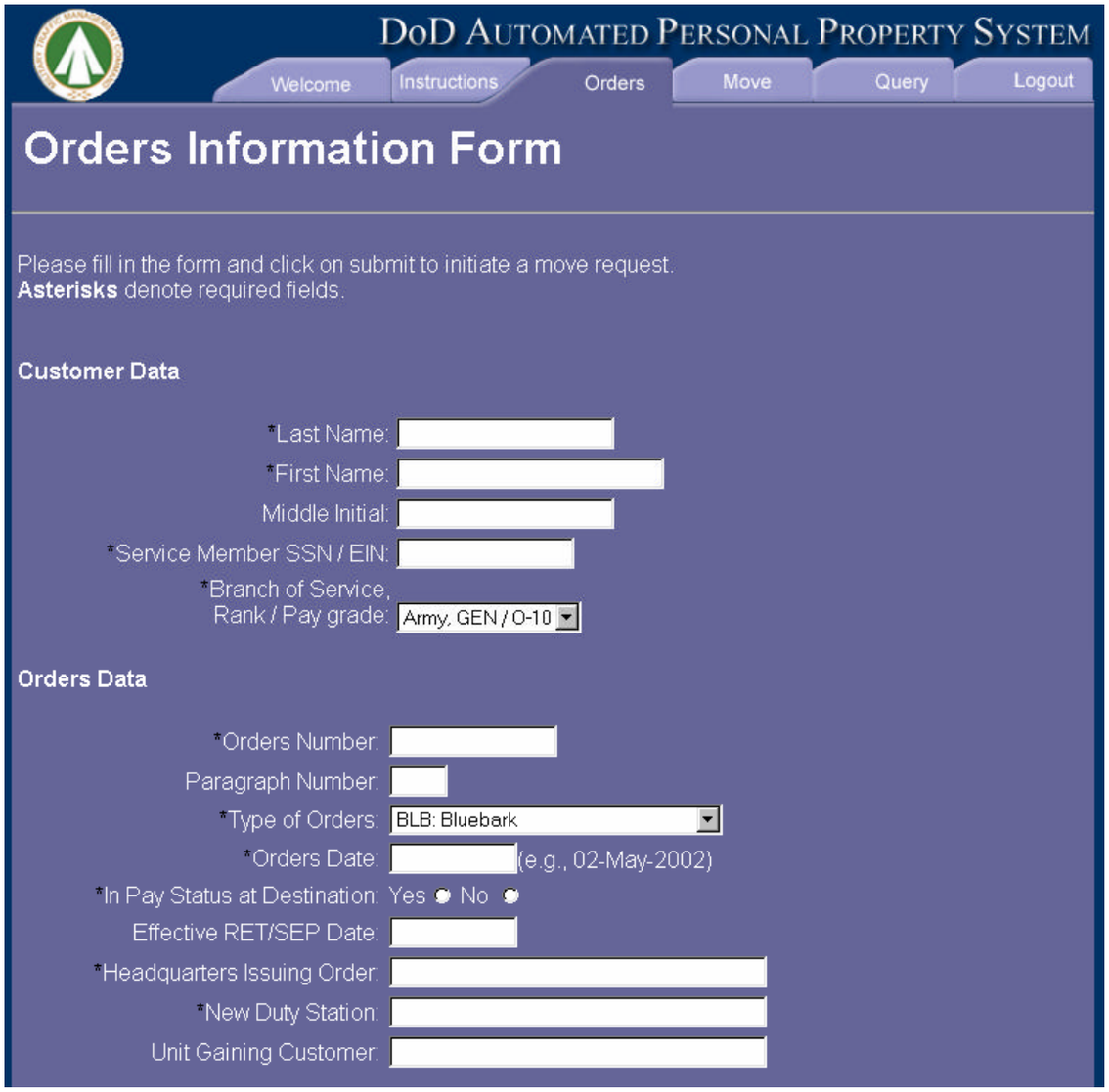

Figure 5-3a: DAPPS – Creating Customer and Orders Data [Prototype]

John uses his paper copy PCS orders with his authorized entitlement information and funds cite information to complete the Orders Data section (Figure 5-3b). The DAPPS design is flexible and future capability could allow this section to be populated electronically from John's Service personnel database.

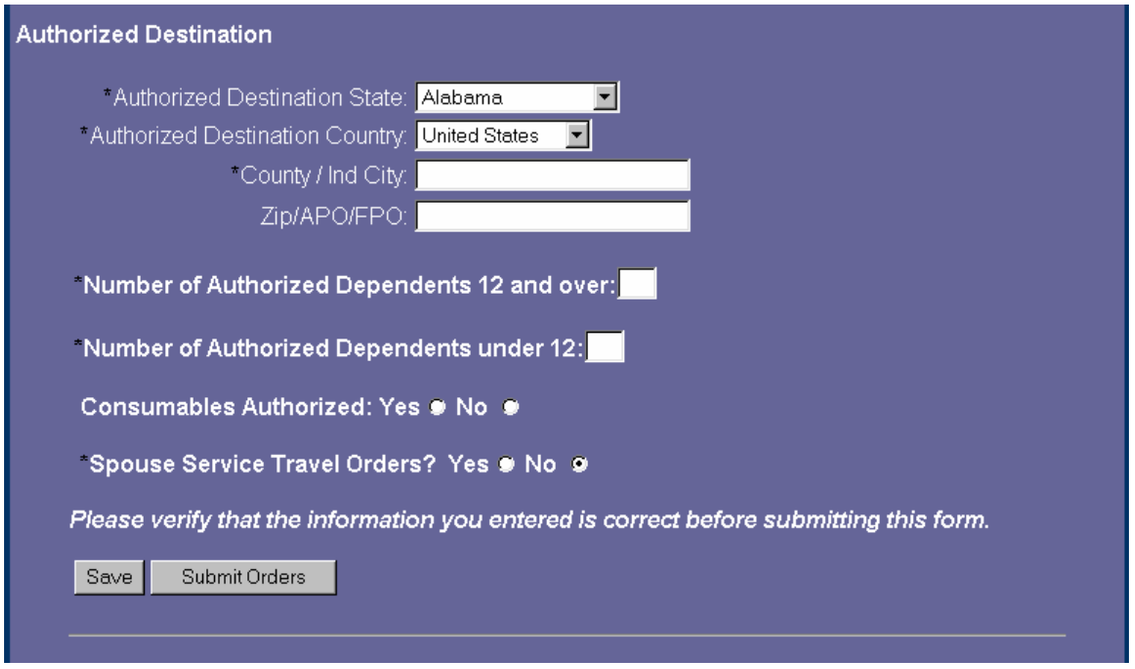

Figure 5-3b: DAPPS – Submitting Customer and Orders Data [Prototype]

During this or other sessions from their computer at home or at other locations, John and Sarah can either choose to continue with the application process or save what they have completed so far and exit. They would use their unique account user name and password to access their saved application information and continue with the process at a later date.

Figure 5-4a: DAPPS – Move Request [Prototype]

John and Sarah have now completed their customer and orders data entry information, and they now get down to the business of documenting their move requirements through the application data collection forms in DAPPS (Figure 5-4a & b).

Figure 5-4b: DAPPS – Move Request Continued [Prototype]

If John did not have access to a suitable computer / web browser he could have gone to his local PPSO and used one of the computers there to submit his application. Likewise, if John was not familiar with using a web browser, a Counselor at any PPSO could create the move request using the DAPPS web-based application.

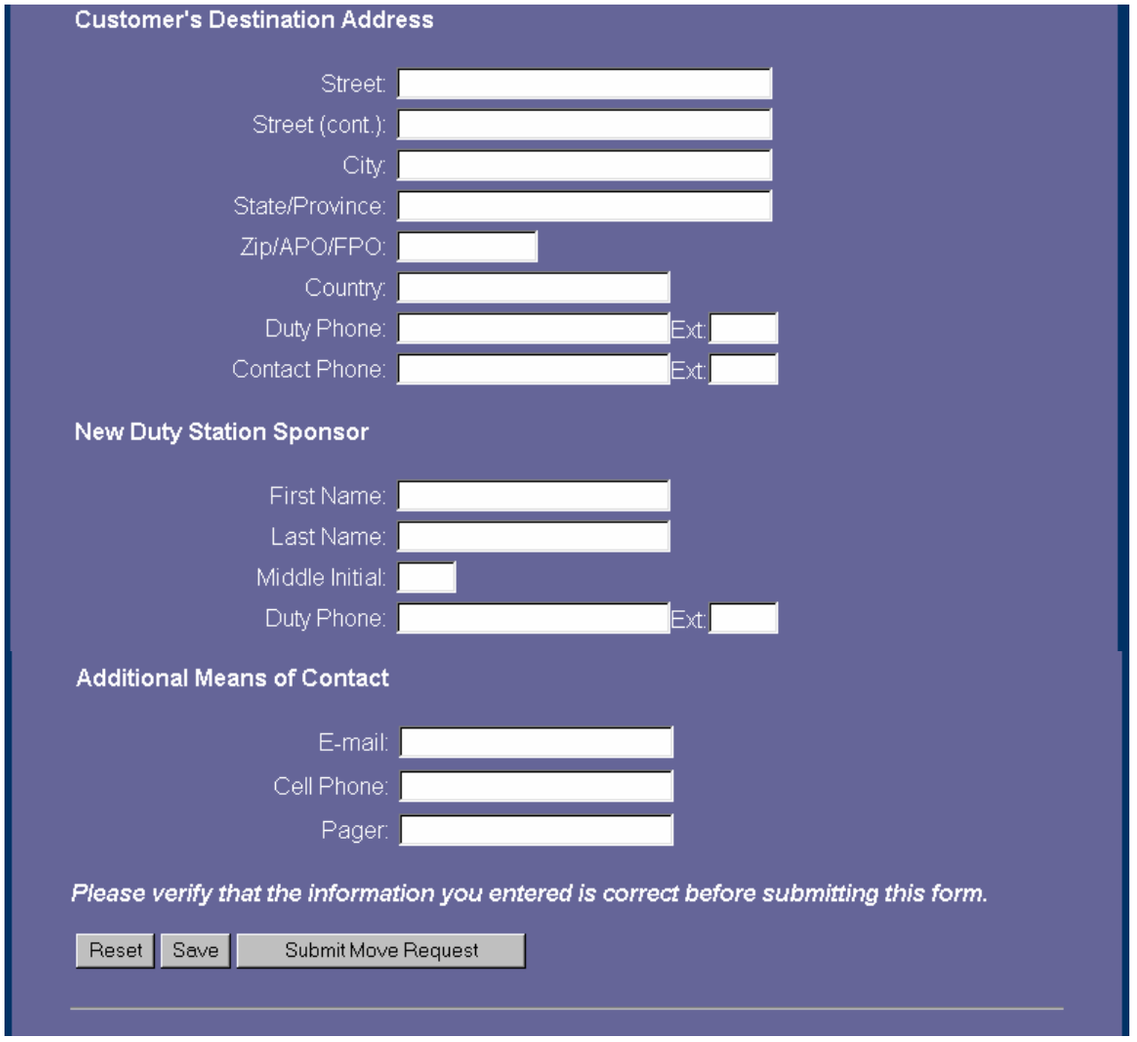

Figure 5-4c: DAPPS – Move Request Continued [Prototype]

With the submission of their move request (Figure 5-4c), John and Sarah have now completed entry of their move application data set. John saves a copy of his application data set and prints it out for future reference. John's application data set is then made available for further processing and approval of John's move request.

All new move request application data sets are stored in a temporary location within DAPPS. DAPPS alerts a Counselor or Transportation Officer at the responsible Personal Property Shipping Office (PPSO) that a new move request application has been submitted.

The counselor would login to the MTMC Electronic Transportation Acquisition (ETA) Portal, which provides single sign-on (login) based on role, access level, and intent to access DAPPS. Nancy Leveret, a counselor at John's servicing PPSO, logs in to DAPPS and pulls up John's move request application (Figure 5-5), and reviews the application and orders data sets for completeness and accuracy. She has the ability to update entries and approve the request which then is moved into DAPPS as a validated application. DAPPS automatically alerts John electronically that his application was validated if he provided an email address. Otherwise, Nancy would contact John using one of the contact means provided in his application data set. At this point, John's approved application data set is automatically acted upon by DAPPS to calculate an estimated cost. Authorized assessorial charges at origin and destination will be captured and can modify the estimated cost of John's move. When John's carrier submits their electronic invoice to the paying vendor (e.g., PowerTrack, DFAS), the invoice is matched up with the estimated cost data generated by DAPPS. The paying vendor will automatically pay the invoice if the carriers invoice is within allowable tolerances of the DAPPS generated estimated cost data.

Nancy could also create the various data sets for individuals that do not have access to a computer/web browser or can not use a computer/web browser using the DAPPS Counselor Menu.

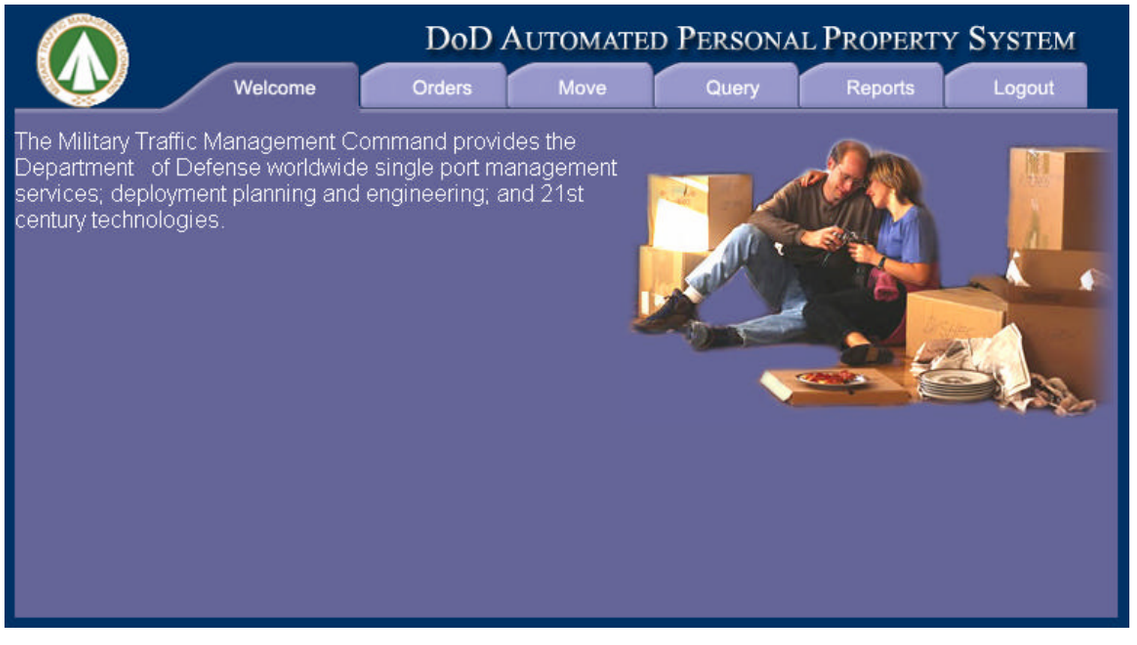

Figure 5-5: DAPPS – Counselor Menu [Prototype]

Any time during John's PCS move he can use a web-browser to access DAPPS and check on the status of the movement or storage of his personal property. From his web browser, John uses the DAPPS customer login (Figure 5-6) to access DAPPS and his data set(s).

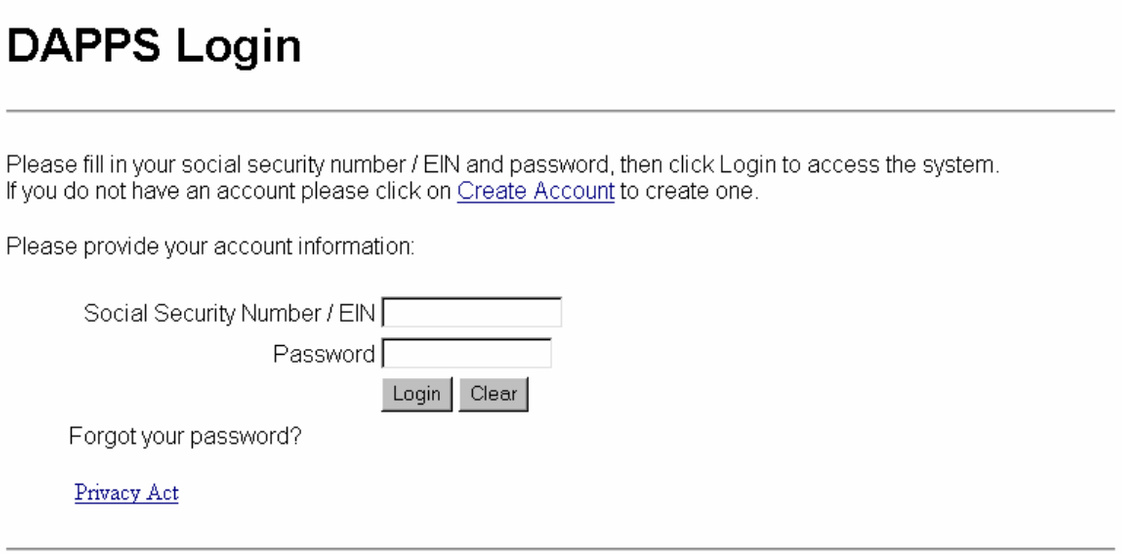

Figure 5-6: DAPPS – Customer Login [Prototype]

John would be returned to the DAPPS home page and he would select the Query tab (Figure 5-7). When John selects the Query tab on the DAPPS Customer Menu, the query goes directly to the Query List Form if there is more than one move, or, if there is only one move, it goes directly to the Query Results Form (Figure 5-8).

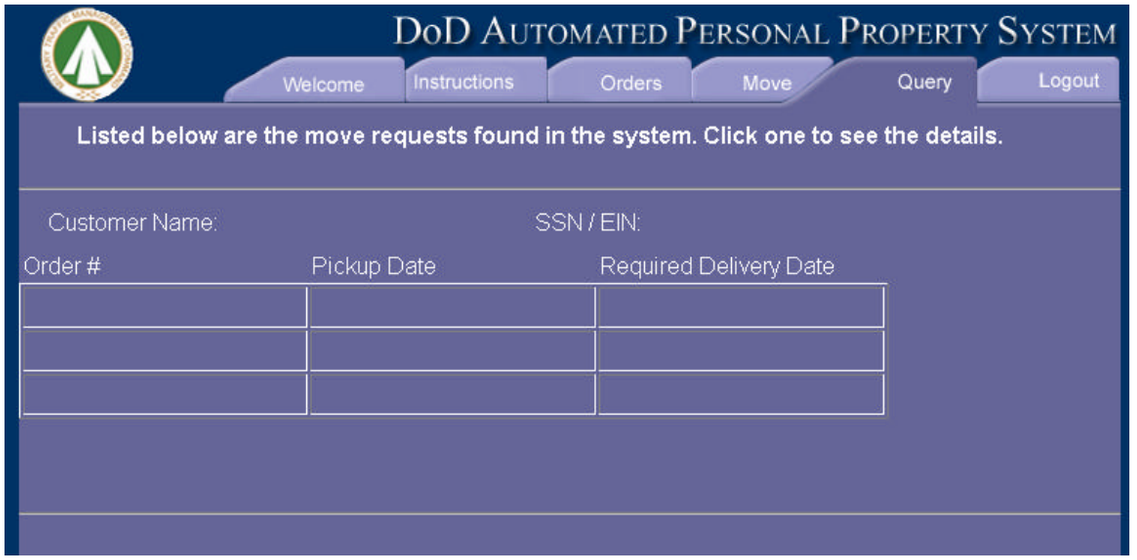

Figure 5-7: DAPPS – Customer Query List Form [Prototype]

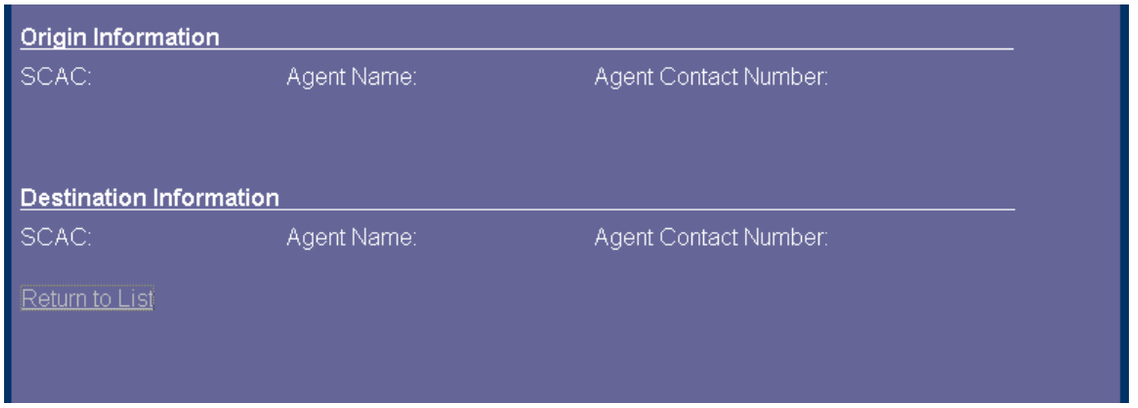

Figure 5-8: DAPPS – Move Request Query Results Form [Prototype]

Nancy, John's Counselor, can likewise query DAPPS records to track the progress of John's move, or she can query the move status for other DoD or Federal agency personnel using the Move Request Query Selection form (Figure 5-9) (available to Counselors) that is used to select the records for the individual(s) of interest.

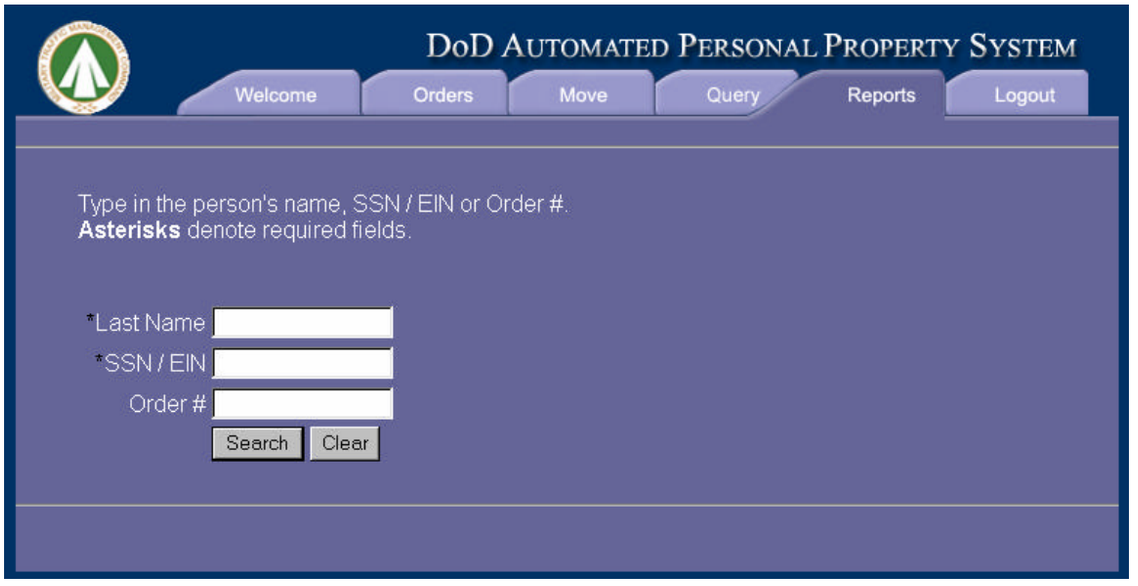

Figure 5-9: DAPPS – Move Request Query Selection Form [Prototype]

The DAPPS Query Results Form is displayed to the Counselor Menu is selected (Figure 5-10).

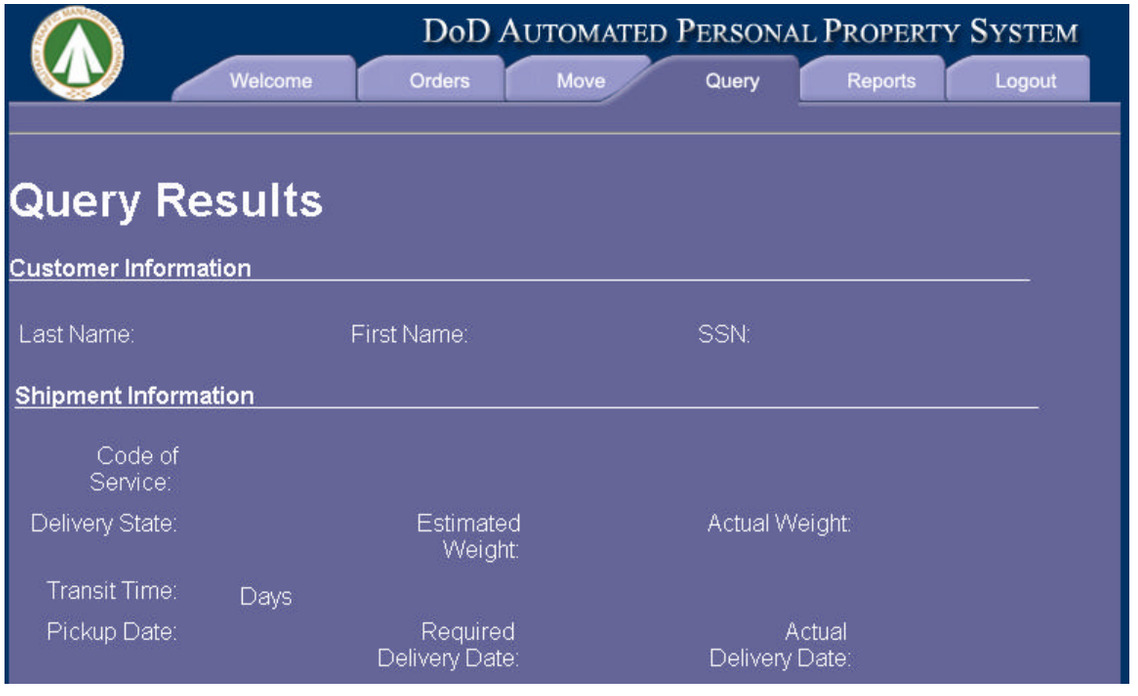

Figure 5-10: DAPPS Counselor– Move Request Query Results Form [Prototype]

Figure 5-11: DAPPS Counselor– Reports Form [Prototype]

As we continue with this scenario, Nancy wants to print John's DD Form 1299, so she selects from the DAPPS Reports tab, the DD Form 1299 (Figure 5-11). The 1299 Selection Form

Figure 5-12: DAPPS Counselor - DD1299 Selection Form

(Figure 5-12) is displayed. She specifies John as the customer whose DD1299 she wants to print by entering John's name and SSN/EIN. Nancy sends this query to the DAPPS database to determine what shipment records are active.

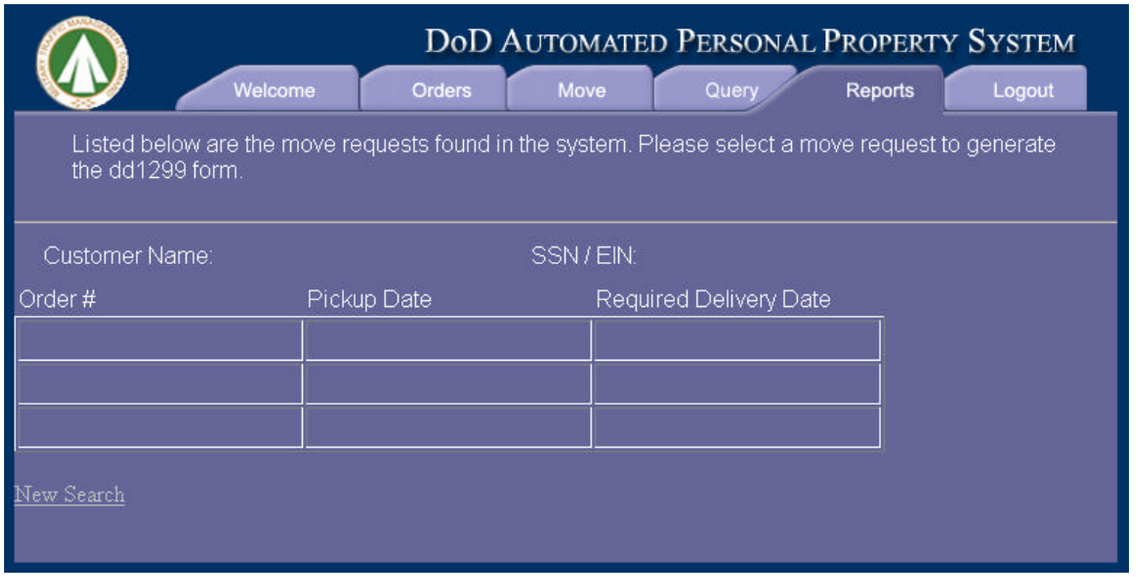

Figure 5-13 DAPPS Counselor– DD Form 1299 List Form [Prototype]

Upon selecting John's appropriate record from the DD1299 List Form screen (Figure 5-13), an electronic rendering of his DD Form 1299 Form is displayed (Figure 5-14). From here, Nancy can print John's form.

APPLICATION FOR SHIPMENT AND/OR STORAGE OF PERSONAL PROPERTY
(Read Privacy Act Statement before completing form.)

1. DATE PREPARED (YYYYMMDD) | 2. SHIPMENT NUMBER

3. NAME OF PREPARING OFFICE | 4. TO *(Responsible Origin Personal Property Shipping Office)* a. NAME

5. NAME OF DESTINATION PERSONAL PROPERTY SHIPPING OFFICE | b. ADDRESS *(Street, Suite Number, City, State, Zip Code)*

6. MEMBER OR EMPLOYEE INFORMATION

a. NAME *(Last, First, Middle Initial)*	b. RANK/GRADE	c. SSN	d. AGENCY

7. REQUEST ACTION BE TAKEN TO TRANSPORT OR STORE THE FOLLOWING:

a. HOUSEHOLD GOODS/UNACCOMPANIED BAGGAGE/ITEMS/NO. OF CONTAINERS *(Enter quantity estimate)*

(1) POUNDS	(2) POUNDS OF PROFESSIONAL BOOKS, PAPERS, AND EQUIPMENT (PBP&E) *(Enter "NONE" if not applicable)*	(3) EXPENSIVE AND VALUABLE ITEMS *(Number of cartons)*

b. MOBILE HOME INFORMATION *(Enter dimensions in feet and inches)*

(1) SERIAL NUMBER	(2) LENGTH	(3) WIDTH	(4) HEIGHT	(5) TYPE EXPANDO *(Describe)*

c. MOBILE HOME SERVICES REQUESTED *(select as applicable)*

☐ CONTENTS PACKED ☐ MOBILE HOME BLOCKED ☐ MOBILE HOME UNBLOCKED ☐ STORED AT ORIGIN ☐ STORED AT DESTINATION

8. THIS SHIPMENT/STORAGE IS REQUIRED INCIDENT TO THE FOLLOWING CHANGE OF STATION ORDERS:

a. TYPE ORDERS *(Select one)* ○ PERMANENT ○ TEMPORARY	b. ISSUED BY	c. NEW DUTY ASSIGNMENT

d. DATE OF ORDERS *(YYYYMMDD)*	e. ORDERS NUMBER	f. PARAGRAPH NO.	g. IN TRANSIT TELEPHONE NO. *(Include Area Code)*

h. IN TRANSIT ADDRESS *(Street, Apartment Number, City, State, ZIP Code)*

9. PICKUP (ORIGIN) INFORMATION	10. DESTINATION INFORMATION
a. ADDRESS *(Street, Apartment Number, City, County, State, ZIP Code) (If a mobile home park, include mobile home court name)*	a. ADDRESS *(Street, Apartment Number, City, County, State, ZIP Code) (If a mobile home park, include mobile home court name)*
b. TELEPHONE NUMBER *(Include Area Code)*	b. AGENT DESIGNATED TO RECEIVE PROPERTY
11. EXTRA PICKUP/DELIVERY ADDRESS *(If Applicable)*	12. SCHEDULED DATE FOR *(YYYYMMDD)* a. PACK | b. PICKUP | c. DELIVERY

13. REMARKS

14. I CERTIFY THAT NO OTHER SHIPMENTS AND/OR NONTEMPORARY STORAGE HAVE BEEN MADE UNDER THESE ORDERS EXCEPT AS INDICATED BELOW *(If applicable)*

a. FROM	b. TO	c. NET POUNDS *(Actual or estimated)*	d. POUNDS OF PBP&E *(Actual or estimated)*

15. CERTIFICATION OF SHIPMENT RESPONSIBILITIES/STORAGE CONDITIONS
I certify that I have read and understand my shipping responsibilities and storage conditions listed here.

a. SIGNATURE OF MEMBER/EMPLOYEE	b. DATE SIGNED	c. ADDRESS OF CONTRACTOR *(Street, Suite No, City, State, ZIP Code)*
d. NAME OF CONTRACTOR *(Origin DPM or non-temporary storage)*		

16. CERTIFICATE IN LIEU OF SIGNATURE ON THIS FORM IS REQUIRED WHEN REGULATIONS SO AUTHORIZED. Property is baggage, household goods, mobile home, and/or professional books, papers and equipment authorized to be shipped at government expense.

a. REASON FOR NONAVAILABILITY OF SIGNATURE	b. CERTIFIED BY *(Signature)*
	c. TITLE

PREVIOUS EDITION IS OBSOLETE WHS/DIOR, Oct 98

DD FORM 1299, SEP 1998 (EG)

Figure 5-14: DAPPS Counselor– Form 1299 Form

Other authorized users of DAPPS can also use the personal property information in DAPPS to support their organization/business processes. In this example, a recurring Navy personnel property report is accessed by Doug Johnson, an authorized user. Like Nancy, Doug logs into DAPPS from the MTMC ETA portal.

Doug is interested in Navy shipment records in DAPPS and uses the Reports tab to view the preformed queries available to him.

Figure 5-15: DAPPS Counselor – Reports Form [Prototype]

He selects the Navy Shipment Report from the DAPPS Reports menu (Figure 5-15). Doug then enters the pickup date range from which they want the report generated. Doug has the option of choosing to write the report to a file, or viewing the report on-line.

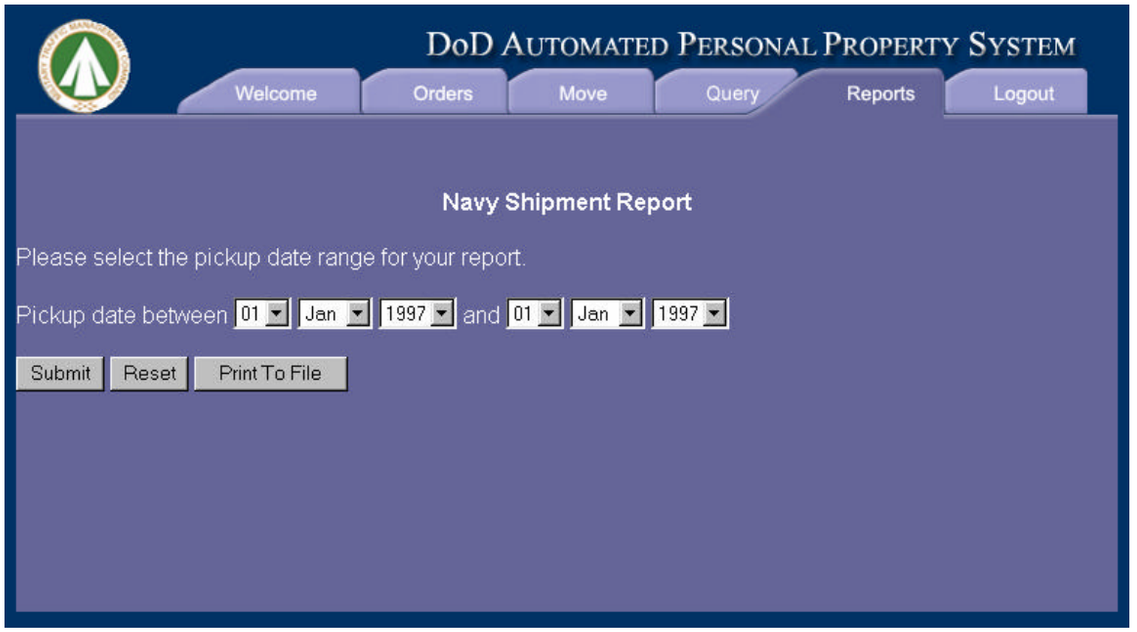

Figure 5-16: DAPPS Authorized User - Navy Shipment Selection Form [Prototype]

The results could be displayed similar to the prototype screen shown in Figure 5-17.

Figure 5-17: DAPPS Authorized User - Navy Shipment Report [Prototype]

Most of the data or reference files needed to implement the personal property movement and storage program for DoD will be incorporated in DAPPS. Functional business logic and algorithms associated with the many existing modules including Counseling, Inbound, Outbound, Non-Temporary Storage, Quality Assurance, One Time Only move, Personal Property Consignment Information Guide, and Personal Property Rates, MTMC Non Use, and the history file will be consolidated into DAPPS. Seamless interfaces to necessary reference data, such as the Defense Table of Official Distances, will be made through DAPPS implementations.

From this brief scenario the general concept of DAPPS, a web-based, real-time, on-line automated transaction business process begins to emerge. The concept envisions the employment of Interactive Voice Response system to support John's future and other members' movement of their personal property worldwide. It will support carrier portals and integration of electronic commerce, as well as electronic data interchange with trading partners. DAPPS will provide a web-based pipeline for real-time forecasting, reduction of customer wait time, and increase time definite personal property delivery.

DAPPS System Implementation Concepts

DAPPS will provide all authorized users with an automated Personal Property Movement and Storage Program management information system based on a web-based paradigm. It will serve as the foundation around which to build an enterprise-wide, fully automated system to provide users with the capability to initiate, process, manage, monitor, and close out requests for movement and/or storage of personal property, in all phases of the operational continuum.

DAPPS should employ an "N-Tiered" architecture, which will permit easier, more cost-effective system administration, alleviate special hardware requirements, accelerate the upgrade process, and provide real time, on-line transaction processing. Access to DAPPS is achieved through any Internet Service Provider (ISP), using any compliant web browser. An open "N-Tiered" design allows for desired capability to be implemented using commercial-off-the-shelf (COTS) products, government-off-the-shelf (GOTS) products, custom components or products or a combination of COTS, GOTS and custom products. Implementing an open "N-Tiered" concept enables standardization and reuse of application components.

"N-Tier" Components

The "N-Tier" architecture offers optimum performance capabilities and flexibility in each layer, and is identified as systems engineering best-practice in the DTS "To-Be" EA model.

5.3.1.1 PRESENTATION LAYER

User Interface: The Web Client is where user services such as a web browser on the local PCs and desktop applications reside.

Public Login: Public login will be intended for system access by service members needing to enter a move request or check the status of their move request.

MTMC Portal: An Internet based application hosted on computers managed by MTMC. Using the web browser, a single sign-on is provided to all authorized MTMC users, including those authorized to use DAPPS. The portal provides authorized users access to the different systems operated by MTMC based on their role, access level, and intent of use.

User Interface Logic: This tier controls the content and appearance of web pages through the use of Java Server Pages Technology (JSP). JSPs dynamically render the output of an operation based logic that is executed at runtime.

5.3.1.2 BUSINESS LOGIC LAYER

Business Logic: Also known as functional logic, this comprises the business and algorithmic rules that implement personal property capability. The functional logic concerning activities such as counseling, inbound, outbound, Non-Temporary Storage (NTS), Quality Assurance (QA), One Time Only (OTO) move, Personal Property Consignment Information Guide (PPCIG), Personal Property Rates (PPR), and MTMC Non Use are captured in this tier. Business Logic will be implemented in Session Enterprise Java Beans, Servlets and Utility Classes. Commercial-off-the-shelf (COTS) products could easily be integrated into the system by wrapping access to the designated products with JSP or Servlet Technology. The COTS products could then take full advantage of the run-time environment services like session management, security, logging, administration, fault tolerance, error handling, threading, and scalability. In this tier load balancing,

to reduce the impact of surges in user accesses or shipments to be processed, can be accomplished via software configuration. The components that implement business logic should be coded to work on any Java 2 Enterprise Edition compliant Application Server.

5.3.1.3 PERSISTENCE LAYER

Data Interface: This tier contains standard APIs for accessing the application data. Java Database Connectivity (JDBC) is a Standard Query Language (SQL) based database access interface that could be implemented in this tier.

Data (Host): This is the prime database server(s) that will contain the personal property records in an ODS/Warehouse configuration as well as dynamic reference files (such as carrier rates, carrier non-use information, official distances). An EDI server can be connected to the Host database for data interchanges between trading partners.

DAPPS Technical Considerations

- DAPPS should be designed using an object-oriented paradigm to take advantage of using 4GL and Java technologies.
- The DAPPS server will be designed to be compliant with the DoD Information Infrastructure Common Operating Environment (DII COE) Integration and Run Time Specification (I&RTS) Level 7.
- DAPPS can support application level components such as character-based, graphic, web-based and voice portals. The DAPPS architecture can be integrated with existing and future data and voice portals by leveraging functionality inherent in the application server tier.
- By developing Java servlets that send and receive eXtensible Markup Language (XML) messages over HyperText Transfer Protocol (HTTP), DAPPS can be easily extended to interface with other systems.
- The emerging web services standards: SOAP, UDDI, and WSDL can be leveraged to implement synchronous or asynchronous connectivity with other portal applications.

- Security requirements, including compliance with DITSCAP, FIPS 140-1 and 2, and other guidelines pending in the DoD Directive Overarching Wireless Policy, are applicable to DAPPS.

- Other relevant factors to MTMC, such as integration with the Electronic Transportation Acquisition (ETA) Portal, support of Public Key Infrastructure (PKI), Active Directory (AD), and the possible infusion of Automated Identification Technology (AIT) are applicable to the DAPPS EA.

- Presentation layer must comply with the Workforce Investment Act of 1998, Section 508, Electronic and Information Technology.

DAPPS Security Considerations

Security for DAPPS is comprised of four areas – security classification of the data, data encryption, user authentication, and user authorization.

5.3.1.4 Security Classification

The information processed by the DAPPS application is sensitive in that it contains personal information about the individuals, such as their social security number. It does not, however, contain any classified information.

5.3.1.5 Encryption

DAPPS will use basic data protection as provided by the Internet browser software through the use of SSL sessions with the web server (a commercial standard). This should be sufficient to protect the privacy of the information exchanged with DAPPS and the user.

5.3.1.6 Authentication

All users will be presented with a login form requesting username and password information. A Java servlet takes the information from the login form and attempt to validate that data against the appropriate database table. Because it is desirable to physically separate the private interfaces from the public interfaces, two different login forms will be implemented – one for private login and the

other for public login. Public login will be intended for system access by service members needing to enter a move request or check the status of their move request. Private login will be intended for counselors, transportation officers, and other internal users including those needing reporting capabilities.

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6.0 LINKAGES TO OTHER ARCHITECTURES

6.1 GENERAL

In line with the DoD Architecture Framework, the DAPPS Operational Architecture (OA), DAPPS Systems Architecture (SA), and DAPPS Technical Architecture (TA) Views comprise the DAPPS EA configuration, Figure 6-1.

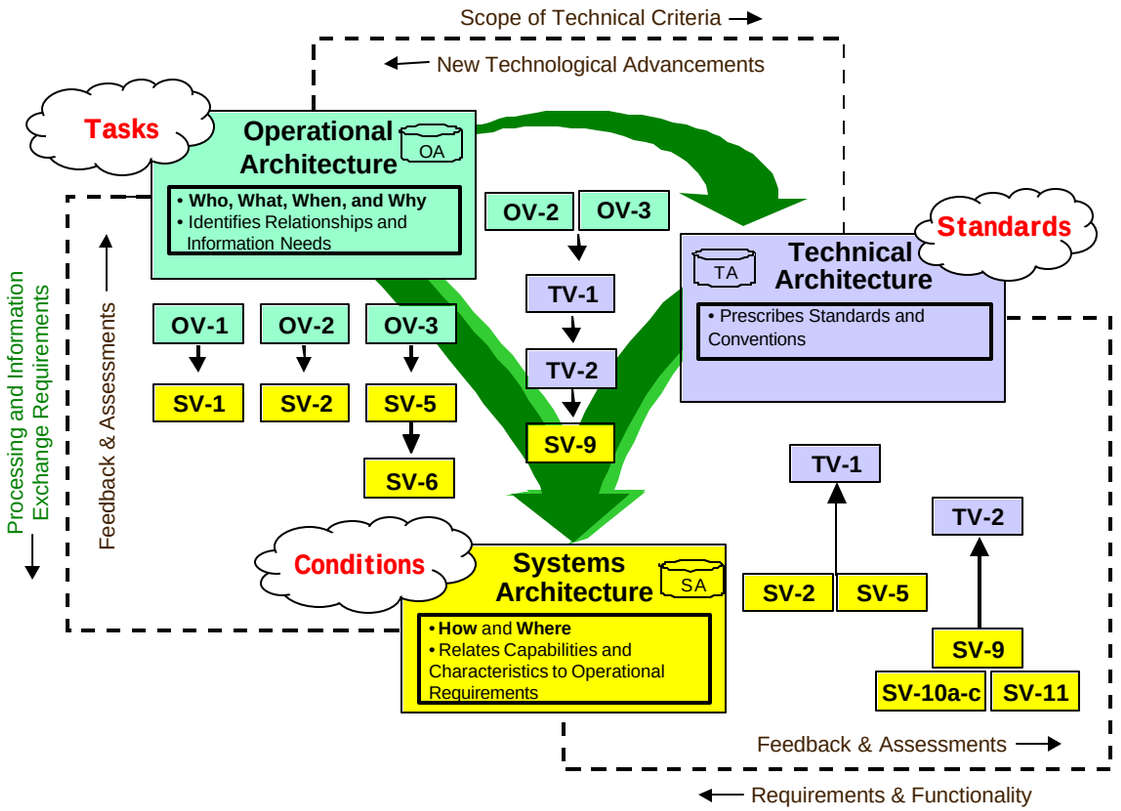

Figure 6-1: A Generalized DAPPS Enterprise Architecture Configuration

The DAPPS OA View contains descriptions of the operational elements, assigned tasks and activities, and information flows required to support the warfighter logistically. It defines the types of information exchanged, the frequency of exchange, which tasks and activities are supported by the information exchanges, and the nature of information exchanges in detail sufficient to ascertain specific interoperability requirements.

The DAPPS SA View is a description of systems and interconnections providing for, or supporting, warfighting logistics functions. The systems architecture view shows how multiple systems link and interoperate, and associates physical resources and their performance attributes to the operational view and its requirements per standards defined in the technical architecture.

The DAPPS TA View is the minimal set of rules governing the arrangement, interaction, and interdependence of system parts or elements, whose purpose is to ensure that a conformant system satisfies a specified set of requirements. The technical architecture view provides the technical systems-implementation guidelines upon which engineering specifications are based, common building blocks are established, and product lines are developed. The technical architecture view includes a collection of the technical standards, conventions, rules and criteria organized into profiles that govern system services, interfaces, and relationships for particular systems architecture views and that relate to particular operational views.

6.2 ANTICIPATED LINKAGES TO OTHER ARCHITECTURES

- Defense Integrated Military Human Resources Systems (DIMHRS)
- Global Transportation Network (GTN) 21 (To-Be)

6.3 ACTUAL LINKAGES TO OTHER ARCHITECTURES

- Global Transportation Network (GTN)
- Defense Transportation Accounting and Reconciliation System (DTARS)
- Defense Table of Official Distances (DTOD)
- Financial and Air Clearance Transportation System (FACTS)
- Consolidated Air Mobility Planning System (CAMPS)
- Global Air Transportation Execution System (GATES)
- Global Decision Support System (GDSS)

- Integrated Computerized Deployment System (ICODES)
- Worldwide Port System (WPS)
- Airlift Service Industrial Fund Integrated Computer System (ASIFICS)
- Financial Management Information System (FMIS)
- Commercial Reservation System (CRS)
- Transportation of Personal Property (TOPS) History (THIST)
- Multiple Commercial Carrier Systems
- Global Freight Management (GFM)
- Advanced Shipping Notification (ASN)

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7.0 ASSUMPTIONS

A Level of Information Systems Interoperability (LISI) Level 4 is the ultimate goal of information systems seeking interoperability across functional activities and informational domains (Intelligence, C2, Logistics, etc.). At this enterprise level, information is shared globally through a distributed information architecture. Applications and systems operate as necessary across all the functional data domains. The virtual workspace uses shared applications operating against an integrated information space. This level represents the capabilities necessary to achieve the MTMC Information Dominance imperative described in the MTMC Strategic Plan 2002 and is the conceptual information sharing goal of the DAPPS EA.

- Procedures – enterprise level Joint/DoD procedures, based on enterprise level understandings of tasks such as the UJTL.
- Applications – integrated into the common distributed information space. Multiple users can access the same instances of enterprise wide data.
- Infrastructure – global networks that support multi-dimensional topologies. These networks may have different areas based on security or access control, but they are integrated appropriately to support the user's needs.
- Data – enterprise data models support the integration of applications. There is a common understanding of the data across the enterprise.

7.1 GENERAL PERFORMANCE CHARACTERISTICS

System performance addresses the operational effectiveness Critical Operational Issues (COIs), Measures of Effectiveness (MOEs), Measures of Performance (MOPs), and associated thresholds and / or objectives with regard to assigned task scenarios.

Mission Scenarios

The versatility of DAPPS will enable it to be deployed under any circumstances, during peace or war, independent of geographical location. DAPPS will be designed to readily adapt to changes in mission scenario.

Employment Tactics

DAPPS EA implementation(s) will take advantage of the shared infrastructure and services of the Global Information Grid (GIG) and will adhere to the Joint Technical Architecture (JTA) and DoD Technical Reference Model (TRM). DAPPS will adhere to the security provisions of the DII COE. Achieving these standards ensures alignment with the DTS EA. Recognizing that personal property information is unclassified but sensitive, and resides within the Worldwide Web (Internet) and the Non-classified Internet Protocol Router Network (NIPRNET), the intent is to share access to this unclassified information through various software applications. Since the DoD is becoming heavily linked with commercial industry to satisfy many logistics requirements, retaining a Worldwide Web (Internet) capability is paramount in achieving knowledge management and joint asset visibility of commercial and U.S government personal property information.

Environmental Conditions

DAPPS EA implementation(s) will be employed worldwide in both hostile and non-hostile environments, operating in a variety of terrain and climatic conditions. DAPPS equipment will be capable of operating in most users' environments through a host of web-based Internet access devices. Environmental requirements for DAPPS will vary depending on the user's operational environment.

Parameters

The DAPPS EA will be functionally focused, and will make all personal property data and functional information available to authorized users on a globally distributed information network.

- Information Accuracy. DAPPS will ensure that the owner/steward of the authoritative source providing data / information is responsible for the accuracy of that data/information.
- Information Completeness. Information completeness is a primary result and benefit of DAPPS. DAPPS applications provide for information completeness through application

interoperability and global availability. Information completeness criteria will measure the information obtained from authoritative sources within the DAPPS and source feeder systems to provide a complete answer to a query. Actual criteria will depend on the requirements of specific applications and shared data and information exchange requirements.

- Information Relevance. DAPPS initiatives will help achieve information relevance through its access to the integrated view of personal property application, sourcing, movement, storage, and management.

- Information Timeliness. DAPPS will facilitate information timeliness by making personal property information available on a worldwide, distributed information network with provisions for user timeliness determination.

- Information Format. DAPPS will comply with user interface standards mandated by the DII COE in order to enhance interoperability, and to minimize training.

Survivability

DAPPS EA implementation(s) must be able to perform its Operations Mode Summary/Mission Profile (OMS/MP) in accordance with the MTMC Continuity of Operations Plan.

7.2 INFORMATION EXCHANGE (INTEROPERABILITY)

Information systems built to meet specific Service requirements must still provide for the appropriate level of C4ISR interoperability to meet joint requirements. As such, understanding the specific nature and degree of interoperability required for an automated personal property information system is a key consideration that must be accounted for when designing, constructing, and deploying implementations within the DAPPS EA.

7.3 APPLICABILITY

DAPPS EA will be adopted by the Services/Agencies as the framework (operational requirements, performance parameters, data flow and information exchange requirements, and architecture issues) for all future personal property application implementations segments or modules.

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8.0 CONSTRAINTS

8.1 DISTRIBUTED COMPUTING

Global distributed computing is a patchwork of disparate applications that were built at different times by different internal and external development groups, each operating without knowledge of the others' choice of tools and designs. There is no way to re-engineer all of these to eliminate all overlapping logic and data. The DAPPS EA integration strategy recognizes organizational boundaries and business realities. The DAPPS interoperability capabilities will be done non-invasively, because Departments, Services or Agencies can not, and in some cases, will not modify their programs or databases to conform to externally defined universal standards.

8.2 ARCHITECTURE DEVELOPMENT

Architecture development techniques and management policies that worked well for handcrafted, discrete applications are ineffective and sometimes even counterproductive when applied to today's heterogeneous, distributed systems. The DAPPS EA envisions adopting new design patterns and management practices to apply to the "city planning" task of integration, while allowing the Services and Agencies to continue their architectural design patterns and management techniques for supporting feeder systems.

8.3 "CITY PLANNING" ARCHITECTURE STANDARDS

Governments, as well as businesses worldwide have been unable to enforce comprehensive enterprise-wide architecture standards to achieve uniformity of technology. No single technology standard can be applied across a broad range of systems, departments, and time. Standards, which are not dynamic, become obsolete. DAPPS EA standards will function like city building codes, verifying quality, but usually not seeking uniformity of building materials, tools or design. The DAPPS "city planning" EA will encompass a variety of alternative standards to apply to different styles of work and be updated annually to diminish the gap between requirements generation and technology implementation.

8.4 "CITY PLANNING" CONCEPTS

On the "city planning" level, with the emphasis now on buying packaged software when automating or re-automating DoD business functions over custom systems, and the increasing demand for integrating the multitude of stove piped systems, the DAPPS EA strategy will be to coordinate the common communication infrastructure, shared resources, and interfaces that span application, system and departmental, Service and Agency boundaries where required.

8.5 COMMUNICATIONS DEMANDS

As DAPPS evolves towards the FY2006 timeframe, additional communication demands on an already limited infrastructure will require upgrades to the existing infrastructures. The DAPPS EA must plan for these expanding communications requirements by coordinating with the various Service and Agency base, camp, post, and station facilities on their planned upgrade of infrastructure based upon customer requirements. With the evolution of web-based applications, and the need for integrated data to support these applications it is imperative that personal property and other logistics information be integrated, accessible, and accurate to ensure that the right information gets to the right place at the right time. The need for a seamless flow of information requires a well-defined supporting communications infrastructure.

8.6 DAPPS TECHNICAL STANDARDS

DAPPS functionality is satisfied in part by the use of the DII COE. Use of the JTA to conform to information technology standards is stated as a requirement. Identification of the applicable DTS EA standards for DAPPS is a continuous on-going effort.

9.0 AUTHORITATIVE REFERENCE SOURCES

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- Defense Transportation System Enterprise Architecture (To-Be), US Transportation Command, January 11, 2001.
- Strategic Plan 2002, Military Traffic Management Command.
- Defense Transportation Regulation (DTR) DOD Regulation 4500.9-R-Part IV Personal Property, August 1999.
- Unclassified Architecture Optimization Report, Military Traffic Management Command, January 11, 2002.
- Unclassified Network and Customer Support Recommendation Report, Military Traffic Management Command, February 1, 2002.
- Unclassified Architecture Optimization Migration Plan, Military Traffic Management Command, February 6, 2002.
- Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Architecture Framework, v2.0, December 18, 1997.
- Joint Technical Architecture, Defense Information Systems Agency and Joint Technical Architecture Development Group, v3.1, March 31, 2000.
- DoD Technical Reference Model, Defense Information Systems Agency TRM Working Group, v2.0, April 15, 2002.
- Adaptations of Department of the Navy Architecture Development Process Model (ADPM).
- C4ISR Core Architecture Data Model (CADM) v2.0, December 1997.

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10.0 FINDINGS AND RECOMMENDATIONS

10.1 DAPPS EA IMPLEMENTATIONS

DAPPS EA implementations should be characterized by a design of a N-tier server architecture as the optimum systems configuration. By designing separate tiers for application, database, and presentation layer logic, DAPPS EA will lay the foundation for an efficient, open, and scaleable architecture that will readily accommodate changes in business rules. The N-tier architecture offers optimum performance capabilities and flexibility in each layer, and is identified as systems engineering best-practice in the DTS "To-Be" EA model. This architecture will provide maximum capability to support application level components such as character-based, graphic, web-based and, of particular interest to the PPPSO, voice portals. The DAPPS EA may be integrated with existing and future data and voice portals by leveraging functionality inherent in the application server tier. By developing Java servlets that send and receive eXtensible Markup Language (XML) messages over HyperText Transfer Protocol (HTTP), DAPPS may be easily extended to interface with other systems. The emerging web services standards: SOAP, UDDI, and WSDL can be leveraged to implement synchronous or asynchronous connectivity with other portal applications.

DAPPS EA capabilities for wireless and remote computing take into consideration security requirements including compliance with DITSCAP, FIPS 140-1 and 2, and other guidelines pending in the DOD Directive Overarching Wireless Policy, dated March 7, 2002. DAPPS EA server design is DII COE Integration and Run Time Specification (I&RTS) Level 7 compliant. The DAPPS EA also considers other factors relevant to MTMC such as integration with the Electronic Transportation Acquisition (ETA) Portal, support of Public Key Infrastructure (PKI), Active Directory (AD), and the possible infusion of Automated Identification Technology (AIT).

10.2 REQUIREMENTS

Some DAPPS EA requirements are driven by the constraints present in the DoD, USTRANSCOM, DTS, and MTMC EA specifications, but others will be defined and derived based on operational requirements. All requirements are documented in a database and tracked in a Requirements Traceability Matrix (RTM). The RTM will be used to trace requirements through each lifecycle phase,

and ensure that all have been satisfied in the end product. In order to adequately size the DAPPS EA implementations, assumptions regarding the number of concurrent users and data ingest rates, as well as requirements for application processing overhead, database memory requirements, and possible future functionality such as Business Intelligence (BI) implementations and In-Transit Visibility (ITV) have been made. The DAPPS EA specifies requirements in accordance with the PPPSO and JDT objectives, to ensure that the strategy is in line with that of MTMC, DTS, USTRANSCOM, and DoD. The DAPPS EA has considered implementations of potential interfaces with internal and external systems such as the MTMC Enterprise Decision Support System (MEDSS) and DTS, respectively.

10.3 COMMUNICATIONS

The current MTMC system environment is evolving to web-based applications. With the evolution of web-based applications, and the need for interoperable data to support these applications, it is imperative that personal property and other applicable logistics information be integrated, accessible, and accurate to ensure that the right information gets to the right place at the right time.

In order to meet the demands for growing communications the DoD is implementing the Global Information Grid (GIG) to provide secure, seamless, flexible information services and technology to the warfighter and customer base that supports the warfighter in peace and war.

10.4 DATA ACCESS

The problems of complicated data models, undocumented data semantics, and the inherent limitations of direct end-user access to heterogeneous production data, all contribute to thwart efforts to achieve universal data access. End users can not be expected to understand where the data is, what it means, and how it is stored across a broad range of independently designed production databases.

The DAPPS EA strategy recognizes the performance and security drawbacks of allowing ad hoc access to authoritative source data. The Analysis Engine in the DAPPS VDE concept will point to the correct authoritative source of data in the Data Warehouse which contains both real-time data in its Operational Data Store (ODS) and snapshot historical (static data) in an archive.

10.5 FORMAL DESIGN

Detailed analysis, data, and design models are architecture concepts, not "city planning" concepts. Their use and reuse happens within the limited scope of a well-managed information architecture domain. There is nothing inevitable, eternal, or universal about an enterprise data or object model. Packaged, legacy, and informally developed applications cannot be practically made to comply to any model, so huge sections of the enterprise application portfolio inevitably remain outside the bounds of any model. Analysis, design, and development are time-consuming so the needs of the enterprise usually change before a model can be universally implemented.

The DAPPS strategy is to develop summary level models that focus on interfaces (city planning). Formal information engineering will be accomplished by the MTMC PPPSO, but only on the most-critical applications and interfaces where quality matters.

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11.0 TOOLS AND FILE FORMATS

Table 11-1. DAPPS EA Tools, Repositories, Directory File Names

PRODUCT	TOOL	NAME OF REPOSITORY	FILE NAME
AV-1	MS Word & PowerPoint 2002	P:\GCSS-AIT\DAPPS Folder\DAPPS All Views\AV-1	DAPPS O&S_AV-1_v1.0.doc
AV-2	MS Access 97	P:\GCSS-AIT\DAPPS Folder\DAPPS All Views\AV-2	DAPPS_ Integrated Data Dictionary_AV-2_v1.0.doc
AV-3	MS PowerPoint 2002	P:\GCSS-AIT\DAPPS Folder\DAPPS All Views\AV-3	DAPPS_CMM_AV-3_v1.0.ppt
OV-1	MS PowerPoint 2002	P:\GCSS-AIT\DAPPS Folder\DAPPS Operational Architecture\OV-1	DAPPS_HiLevel Ops Con_11X17_OV-1_v1.4.ppt
OV-2	Visio Pro 2000	P:\GCSS-AIT\DAPPS Folder\DAPPS Operational Architecture\OV-2	DAPPS Node Connectivity_11X17_OV-2_v.10.vsd
OV-3	MS Excel 2002	P:\GCSS-AIT\DAPPS Folder\DAPPS Operational Architecture\OV-3	DAPPS <name> IERs_11X17_OV-3_v1.0.xls
OV-4	MS PowerPoint 2002	P:\GCSS-AIT\DAPPS Folder\DAPPS Operational Architecture\OV-4	DAPPS Org Relations_11X17_OV-4_v2.1.vsd
OV-5	Visio Pro 2000	P:\GCSS-AIT\DAPPS Folder\DAPPS Operational Architecture\OV-5	DAPPS Activity Model_11X17_OV-5_v1.5
OV-7	Visio Pro 2000	P:\GCSS-AIT\DAPPS Folder\DAPPS Operational Architecture\OV-7	DAPPS LDM_11X17_OV-7_v1.0.vsd
SV-1	Visio Pro 2000	P:\GCSS-AIT\DAPPS Folder\DAPPS Systems	DAPPS Sys Interface_11X17_SV_v1.0.vsd

		Architecture\SV-1	
SV-11	Visio Pro 2000	P:\GCSS-AIT\DAPPS Folder\DAPPS Systems Architecture\SV-11	
TV-1	MS Word 2002	P:\GCSS-AIT\DAPPS Folder\DAPPS Technical Architecture\TV-1	DAPPS Tech Arch Profile_TV-1_v1.0.doc
TV-2	MS Word 2002	P:\GCSS-AIT\DAPPS Folder\DAPPS Technical Architecture\TV-2	DAPPS Std Forecast_TV-2_v1.0.doc
	MS PowerPoint 2002	P:\GCSS-AIT\DAPPS Folder\DAPPS EA Deliverable\	DAPPS EA_11X17_BlueprintBook_v1.0.ppt

12.0 CONFIGURATION MANAGEMENT

The DAPPS EA will be supported with a requirements-based CM process. This CM process will be supported by a requirements traceability management mechanism contained within the OA's requirements database. This capability has been established to record and track mappings of requirements from identification through assessment, validation and implementation.

CM and the DAPPS EA become the analytical mechanisms used to provide a repeatable, measurable management mechanism for phased implementations, and will also be used to provide input to functional level performance measurements. The DAPPS EA and supporting CM process will act as a consolidated record of the functional requirements process in action, provide a means to explore requirements in greater depth, and aid in measuring progress toward fulfilling objectives and goals of the evolutionary phased implementations of DAPPS. Together, the DAPPS EA and CM process will ensure that the implementation of DAPPS effectively meets customer needs by providing responsive, secure, customer-focused, best value integrated end-to-end services.

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APPENDIX A
SELECTED DAPPS EA PRODUCTS

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APPENDIX B
GLOSSARY

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PART I – ACRONYMS

Acronym	Meaning
AD	Active Directory
ADPM	Architecture Development Process Model
AF	Architecture Framework
AIS	Automated Information Systems
AIT	Automated Identification Technology
API	Application Program Interface
ASIFICS	Airlift Service Industrial Fund Integrated Computer System
AV-1	All View-1 (Overview and Summary Information)
AV-2	All View-2 (Integrated Dictionary)
AV-3	All View-3 (Capability Maturity Profile)
BI	Business Intelligence
C3I	Command, Control, Communications, and Intelligence
C4	Command, Control, Communications, and Computers
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CADM	Core Architecture Data Model
CAMPS	Consolidated Air Mobility Planning System
CM	Configuration Management
COI	Critical Operational Issues
CONOPS	Concept of Operations
COTS	Commercial-Off-The-Shelf
CRM	Customer Relations Management
CRS	Commercial Reservation System
CSA	Customer Service Assurance
DAPPS	Department of Defense Automated Personal Property System

Acronym	Meaning
DCS	Deputy Chief of Staff
DFAS	Defense Finance and Accounting Service
DII COE	Defense Information Infrastructure Common Operating Environment
DIMHRS	Defense Integrated Military Human Resources System
DITSCAP	Defense Information Technology Security Certification and Accreditation Process
DoD	Department of Defense
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership, Personnel, & Facilities
DTARS	Defense Transportation Accounting and Reconciliation System
DTOD	Defense Table of Official Distances
DTR	Defense Transportation Regulation
DTS	Defense Transportation System
DUSD	Deputy Under Secretary of Defense
EA	Enterprise Architecture
EDI	Electronic Data Interchange
EED	Essential Elements of Data
EJB	Enterprise Java Beans
ETA	Electronic Transportation Acquisition
FACTS	Financial and Air Clearance Transportation System
FIPS	Federal Information Processing Standard
FMIS	Financial Management Information System
GATES	Global Air Transportation Execution System (Navy)
GDSS	Global Decision Support System
GIG	Global Information Grid
GOTS	Government-Off-The-Shelf
GTN	Global Transportation Network

Acronym	Meaning
HTTP	Hyper Text Transfer Protocol
I&RTS	Integration and Run Time Specification
ICODES	Integrated Computerized Deployment System
ISP	Internet Service Provider
IT	Information Technology
ITV	In-Transit Visibility
J2EE	Java 2 Enterprise Edition
JDBC	Java Database Connectivity
JDST	Joint Decision Support Tool
JDT	Joint Development Team
JSP	Java Server Page
JTA	Joint Technical Architecture
JTCC	Joint Transportation Corporate Information Management Center
JTF	Joint Task Force
JV2020	Joint Vision 2020
LDM	Logical Data Model
LISI	Levels of Information Systems Interoperability
MEDSS	MTMC Enterprise Decision Support System
MOE	Measures of Effectiveness
MOP	Measures of Performance
MTMC	Military Traffic Management Command
NIPRNet	Non-classified Internet Protocol Router Network
NTS	Non-Temporary Storage
ODS	Operational Data Store
OLTP	On-Line Transaction Processing
OMS/MP	Operations Mode Summary / Mission Profile
OTO	One Time Only

Acronym	Meaning
OV-1	Operational View-1 (High-level Operational Concept Graphic)
OV-2	Operational View-2 (Operational Node Connectivity Description)
OV-3	Operational View-3 (Operational Information Exchange Matrix)
OV-4	Operational View-4 (Command Relationship Chart)
OV-5	Operational View-5 (Activity Model)
OV-6a	Operational View-6a (Operational Rules Model)
OV-6b	Operational View-6b (Operational State Transition Description)
OV-6c	Operational View-6c (Operational Event/Trace Description)
OV-7	Operational View-7 (Logical Data Model)
PKI	Public Key Infrastructure
PPCIG	Personal Property Consignment Information Guide
PPPSO	Passenger and Personal Property Systems Office
PPR	Personal Property Rates
QA	Quality Assurance
RDBMS	Relational Database Management System
RMI	Receiving Module Identification
RTM	Requirements Traceability Matrix
SOAP	Simple Object Access Protocol (XML protocol)
SQL	Standard Query Language
SSL	Secure Sockets Layer
SV-1	Systems View-1 (System Interface Description)
SV-2	Systems View-2 (Systems Communications Description)
SV-3	Systems View-3 (Systems Matrix)
SV-4	Systems View-4 (Systems Functionality Description)
SV-5	Systems View-5 (Operational Activity to System Function Traceability Matrix)
SV-6	Systems View-6 (System Information Exchange Matrix)

Acronym	Meaning
SV-7	Systems View-7 (System Performance Parameters Matrix)
SV-8	Systems View-8 (System Evolution Description)
SV-9	Systems View-9 (System Technology Forecast)
SV-10a	Systems View-10a (Systems Rules Model)
SV-10b	Systems View-10b (Systems State Transition Description)
SV-10c	Systems View-10c (Systems Event/Trace Description)
SV-11	Systems View-11 (Physical Data Model)
T-HIST	Transportation of Personal Property (TOPS) History
TO	Transportation Officer
TOPS	Transportation Operational Personal Property System
TRM	Technical Reference Model
TV-1	Technical View-1 (Technical Architecture Profile)
TV-2	Technical View-2 (Standards Technology Forecast)
UDDI	Universal Description, Discovery and Integration
UJTL	Universal Joint Task List
USTRANSCOM	United States Transportation Command
VDE	Virtual Data Environment
WPS	World-wide Port System
WSDL	Web Services Description Language
XML	eXtensible Markup Language

Part II - Definitions

Architecture: A framework or structure that portrays relationships among all the elements of the subject force, system, or activity.

Automated Information System (AIS): AIS consists of the software, hardware, and procedures that constitute a functional application.

Common Operating Environment (COE): Services that support the development of the common reusable software modules that enable interoperability across multiple combat support applications. This includes segmentation of common software modules from existing applications, integration of commercial products, development of a common architecture, and development of common tools for application developers.

Configuration Management (CM): The management of a system's hardware, software, firmware, documentation, test, test fixtures, and test documentation throughout the development and operational life of the system.

Defense Information Infrastructure (DII): A seamless web of communications networks, computers, software, databases, applications, and other capabilities that meets the information processing and transport needs of DoD users in peace and in all crises, conflict, humanitarian support, and wartime roles.

Department of Defense (DoD): The Office of the Secretary of Defense (OSD), Military Departments and Military Services within those departments, Joint Chiefs of Staff (JCS), Unified and Specified Combatant Commands, Defense Agencies and DoD Field Activities, and other organizations established or designated by the President, Secretary of Defense, or law.

Electronic Data Interchange (EDI): The computer-to-computer exchange of business data in a standardized format between trading partners.

Global Information Grid (GIG): An open systems architecture that provides global connectivity instantaneously on warrior demand. The grid can support both vertical and horizontal information flow to joint and multinational forces.

Global Transportation Network (GTN): GTN gathers data from a number of DoD, Services, agencies, and commercial transportation systems to satisfy USTRANSCOM's command and control

needs and DoD's In-Transit Visibility (ITV) needs. GTN will provide the visibility to improve both movement efficiencies and command and control of the transportation pipeline.

In-Transit Visibility (ITV): The ability to track the identity, status, and location of DoD unit and non-unit cargo, passengers, and medical patients throughout their movement during peace, contingencies, and war.

Information Technology (IT): Any equipment or interconnected system or subsystem of equipment, that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by a DoD Component. The term "information technology" includes computers, ancillary equipment, software, firmware, and similar procedures, services including support services), and related resources.

Internet: The Internet is a worldwide system of computer networks - a network of networks in which users at any one computer can, if they have permission, get information from any other computer.

JAVA: A general purpose, high-level, object-oriented, cross-platform programming language.

Joint Decision Support Tools (JDSTs): Decision aids that aggregate, categorize, and depict data elements in an easy to use format. JDST provides decision makers at all levels with accurate, real-time data to collaboratively plan, prioritize, and redirect combat support operations. These tools improve Course of Action (COA) analysis, execution monitoring, and dynamic replanning when execution deviates from planning assumptions.

Joint Task Force (JTF): The headquarters activated to exercise operational control of assigned military forces to perform a (generally short term) operational mission.

Joint Technical Architecture (JTA): Standards for design and development of automated information systems.

N-Tier: (meaning 'some number of tiers'). An n-tier application program is one that is distributed among three or more separate computers in a distributed network.

Non-classified Internet Protocol Router Network (NIPRNet): A subset of the DII that provides end to end information transfer and value added services for the transport of unclassified data. It is a router based wide area network of the DISN. The NIPRNet transmits Unclassified but Sensitive data/information. (JP 6-02)

PKI: A PKI (public key infrastructure) enables users of a basically unsecure public network such as the Internet to securely and privately exchange data through the use of a public and a private cryptographic key pair that is obtained and shared through a trusted authority. The public key infrastructure provides for a digital certificate that can identify an individual or an organization and directory services that can store and, when necessary, revoke the certificates.

Real-Time: Pertaining to the timeliness of data or information which as been delayed only by the time required for electronic communication. This implies that there are no noticeable delays.

Universal Joint Task List (UJTL): The coordinated set of doctrinal tasks at the Strategic National (SN), Strategic Theater (ST), Operational (OP), and Tactical levels of military operations that contribute to the achievement of missions.

Virtual data environment (VDE): Common services that support the implementation and maintenance of data resources that are used by two or more combat support applications. Services provided include: identification of common data, physical data modeling, data base segmentation, development of data access and maintenance routines, and data base reengineering to use the common data environment.

Web-Based: Developed to operate over a TCP/IP network (such as the Internet, NIPRNet, or SIPRNet) using the World Wide Web (WWW) family of protocols, including the HyperText Transfer Protocol (HTTP). For example, a web-based application generally employs a web browser as the primary user interface for clients. Those clients then interact with application servers (web servers) using HyperText Mark-up Language (HTML), Java™, Active-X, XML, and related technologies. Web-based applications have the advantage of simplified life-cycle maintenance because the developer generally does not need to distribute software updates to every client. Instead, updates are concentrated at the servers. Web technology also dominates in the commercial sector. Web-based developers can more easily take advantage of commercial products. However, web-based technologies may assume communications bandwidth that is not available in some environments (e.g., a combat net radio network).

Web Server: A software program (using the client/server model and the World Wide Web's Hypertext Transfer Protocol (HTTP)) serves the files that form Web pages to Web users (whose computers contain HTTP clients that forward their requests).